Developments in technical and vocational education

A comparative study

Trends
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Preface

This study is the first title in a new series, 'Trends and Issues in Technical and Vocational Education'. The series is addressed to teacher-educators, administrators, planners and all those interested in the current and possible future status of technical and vocational education on an international scale. The long-term objective is to promote the implementation of Unesco's Revised Recommendation concerning Technical and Vocational Education which was adopted by the General Conference of Unesco at its eighteenth session in 1974.

The present comparative study had its origin in reports submitted by the twenty-three countries that participated in an international conference held in Denver, Colorado, United States of America, in June 1976. This conference (and a number of similar conferences) highlighted the need for more accurate information in technical and vocational education, particularly as regards ongoing reforms and innovations. It was felt, therefore, that Unesco would render a service to its Member States by publishing these reports in the form of a condensed comparative study.

We wish to express our appreciation to all those who prepared these reports along given guidelines, thus greatly facilitating the comparative analysis. We also wish to thank Dr Mary Ann Calkins Pilain, Unesco consultant, who compiled the first draft of the study which was then sent out for revision to the authorities concerned. The final version is based on the comments received from these countries.

The views expressed in this book are those of the individuals concerned and do not necessarily reflect those of Unesco. The designations employed and the presentation of the material do not imply the expression of any opinion whatsoever on the part of the Unesco Secretariat concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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1 Introduction

Countries undertaking the enormous task of restructuring, reorienting and expanding their educational systems to meet development needs are devoting more and more attention to the role of technical and vocational education. Indeed, political leaders, economic planners and educators in many countries appear to consider the development of technical and vocational education as the keystone of an educational system best adapted to the individual and the society in which he or she lives. In recent years, progress has been made not only in expanding technical and vocational education to meet skilled manpower needs but also in terms of broad reform directed at making education as a whole more responsive to social and economic development requirements. Countries engaged in this process are thus seeking the means by which obstacles to progress may be most rapidly and effectively removed.

Unesco has been involved for a number of years in promoting the development of technical and vocational education in many areas of the world. Recently, however, these efforts have taken on a new dimension as virtually all countries have been engaged in rethinking their educational systems and have concluded that a much larger place must be given to technical and vocational education if education is to be responsive to contemporary conditions. With the adoption by its General Conference, at its eighteenth session in November 1974, of the Revised Recommendation concerning Technical and Vocational Education, Unesco acquired a comprehensive set of internationally accepted policy guidelines covering all aspects of technical and vocational education and its role within education as a whole.

On the basis of the provisions contained in this Revised Recommendation under the heading 'International Co-operation',[1] Unesco is currently engaged in developing information resources directed particularly to the needs of developing countries, and in promoting their distribution worldwide. This information strategy is designed to disseminate information concerning issues and innovations in technical and vocational education so that Member States may benefit from common experiences; but it is also intended actively to promote the collection, analysis and evaluation of information as well as the carrying out of research concerning problems in technical and vocational education and possible solutions.

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[1] See Appendix I, 'Revised Recommendation concerning Technical and Vocational Education', paras. 93–100, on pages 134-5.

The present study has been prepared with the above objectives in mind. It is a report on, and a comparative analysis of, the experience of twenty-three developing countries: Afghanistan, Bangladesh, Bolivia, Burma, Chile, Costa Rica, Ethiopia, India, Ivory Coast, Jordan, Kenya, the Republic of Korea, Liberia, Malaysia, Nepal, Nigeria, Panama, Paraguay, Sierra Leone, Thailand, Uganda, Upper Volta and Uruguay. The material upon which the study is based was made available by these countries on the occasion of their participation in the International Conference on Technical and Vocational Education, sponsored in 1976 by the United States Office of Education in co-operation with Unesco and the Inter-American Development Bank. Participants in the meeting were requested to prepare country reports and these provide a clear picture of the present state of technical and vocational education in a fair sample of developing countries, as well as common problems of development and general trends in innovation.

The country reports were prepared according to guidelines provided by Unesco. The guidelines, reproduced in Appendix II, are divided into two major parts. The first calls for a profile of technical and vocational education in the country; while the second requests an analysis of the problems faced by the country in developing technical and vocational education and of the innovations undertaken to solve these problems. This study follows the same pattern, with Chapters 2–5 sketching a general profile of technical and vocational education in these countries, and Chapter 6 dealing with common problems of development and trends in innovation.

It is evident from the reports that the twenty-three countries are making considerable efforts to develop and expand technical and vocational education within the context of overall educational reform, despite the obstacles barring the way. In the last five years, broad policies for 'outer' reform have been adopted which often represent a marked departure from traditional approaches to education, and new structures are being created. These new policies and reforms have as their major goal the creation of more flexible educational structures and greater educational opportunities in accordance with the concept of lifelong education. Technical and vocational education has come to occupy a large place in these new approaches because of the interlinked problems (which in fact confront numerous countries at all levels of development) of lack of skilled manpower for economic development and high rates of under- and unemployment among the products of the traditional education systems. Yet if technical and vocational education is to contribute to solving these problems, its implementation requires in many countries a series of 'inner' reforms and improvements of technical and vocational education itself. The central issue is to determine those areas in which action towards inner reform and improvement may most effectively be taken and in which this action will have the broadest impact; that is, areas where urgent practical measures may be taken to answer immediate needs while at the same time serving longer range development goals. The major purpose of this study is to aid in identifying such areas for action by helping Member States of Unesco to exchange information and share their experience in technical and vocational education.

2 Educational systems

The basic prerequisite for any study in comparative education is an initial comparative analysis of the educational systems of the countries involved. The countries providing reports for the present study each described, in greater or lesser detail, their educational systems as a whole and the place of technical and vocational education within those systems. This information was adapted to a common schematic presentation (which in itself represents an analysis of the material provided) and the results are presented as Figures 1–22 in the following pages.[1] The material contained in this chapter will be referred to throughout the study.

The most striking feature of the educational systems described in the reports is that they are currently undergoing considerable change. It is very clear that any description of most of the systems, either verbal or schematic, will very soon be outdated as new institutions are created, old ones reorganized and new educational paths opened among the various constituent parts of the systems. Some of the countries emphasized the forms to be taken by the educational system in the light of existing legislation and steps already taken to implement it. Others described more fully the existing structures and noted the points of projected change in the system. Because of this change and the co-existence in many cases of structures representing an older system alongside structures being put into place for future development, a clear and detailed picture of each system is not easily constructed. So far as is possible from the information provided, the following diagrams indicate for each country: educational levels, types of institutions, points of articulation within the systems and qualifications acquired at the end of any given programme.

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[1] The information provided by one country was not sufficiently detailed to allow for a schematic representation.

Key to Figures 1-22

▭	Separate categories of institutions within the educational system
░	Presence of technical and vocational subjects within the general education curriculum
▤	Comprehensive institutions
▩	Institutions exclusively for technical and vocational education
⬚	Institutions for technical and vocational education outside the formal education system
⟶	Normal routes through the system
⇢	Second or unusual routes through the system
◐	Examinations required to obtain recognition of successful completion of one level of education before proceeding to the next level
○	Engineering qualification
●	Skilled worker or craftsman qualification
◉	Technician qualification
T	Technical teacher qualification

Afghanistan

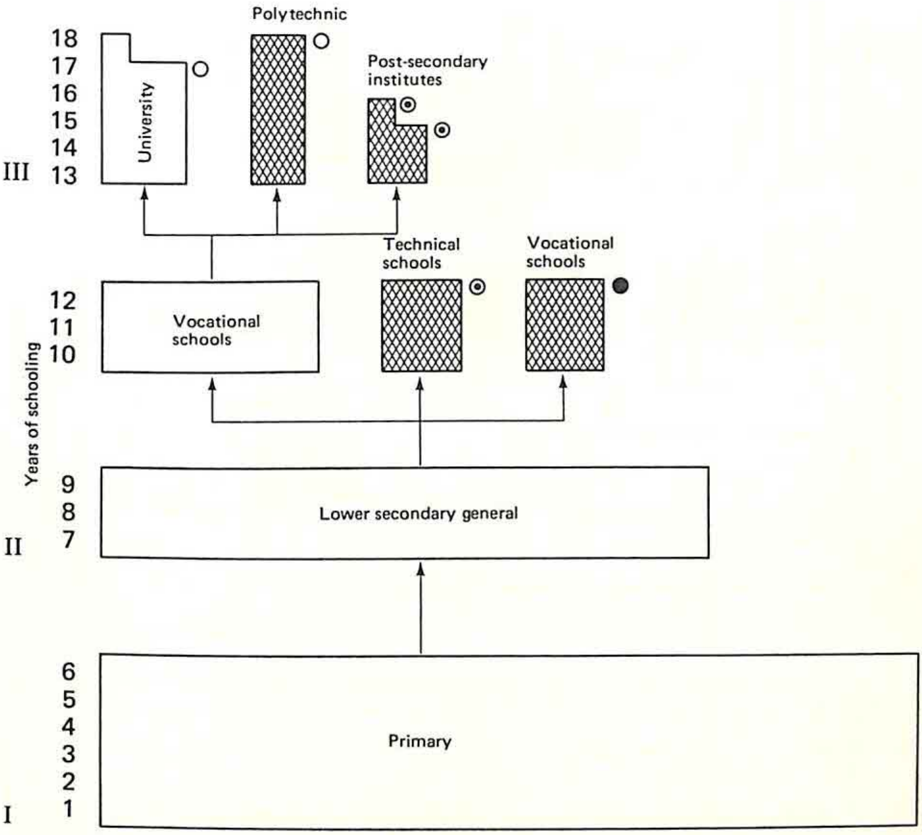

FIG. 1. The above system reflects the situation before the educational reform adopted by Afghanistan in 1975 and now about to be implemented. Technical education was separate from vocational education (craft and mechanical schools, commercial schools, agricultural schools) and both were separate from the academic schools. When the reform is implemented, the country will move towards a more comprehensive system. The structure will comprise eight years of basic education, and during the last two years, handicrafts and some vocational subjects will be introduced. It is proposed that access to secondary education, which will consist of four years of schooling, should be regulated by examination and training courses offered to those who do not continue in secondary education. Secondary education will have two streams — the academic and the technical — and the ultimate aim is to have at least 50 per cent of the secondary school enrolment in the technical stream. The reform also proposes to develop post-secondary technical education, and post-secondary institutes have recently been created as may be seen from the above diagram; among them the Industrial Management Institute, the Higher Institute of Agriculture and the Higher Institute of Accounting. The Polytechnic is a degree-level institution offering specialized engineering courses.

Bangladesh

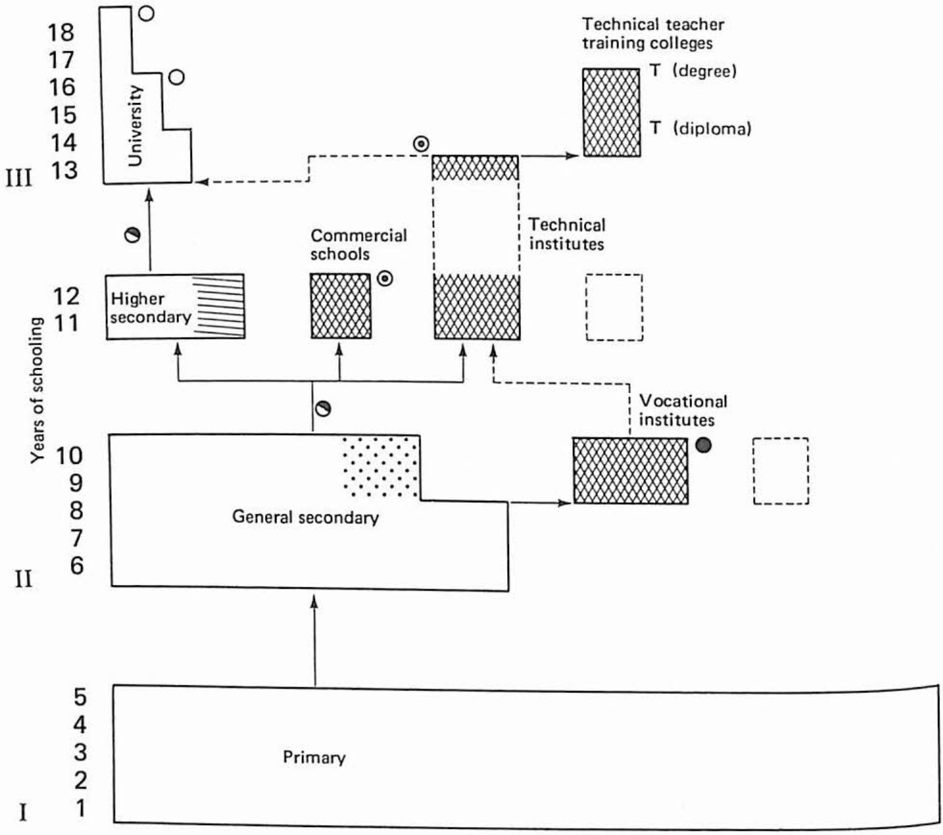

FIG. 2. There are two major points of articulation in the educational system of Bangladesh. The first takes the form of the Secondary School Certificate Examination at the end of the tenth year of schooling which determines entrance to higher secondary education. If certificate-holders from the vocational institutes pass this examination they are eligible for admission to the technical institutes. The second point occurs after the twelfth year of schooling with the Higher School Certificate Examination which leads to university studies. Outstanding diploma-holders from the technical institutes may also enter university but are eligible for admission to the engineering faculties only. Within general education on the secondary level, introductory technical and vocational options are available in some schools in the ninth and tenth grades. Some higher secondary schools are comprehensive in conception and students may choose commercial or home-economic streams, or industrial or agricultural biases within the science stream. Several types of institution for vocational education exist outside the educational structure: vocational training centres and apprenticeship programmes under the Ministry of Labour which require an eighth-grade pass for admission and several agricultural schools operated by the Ministry of Agriculture requiring a tenth-grade pass for admission.

Bolivia

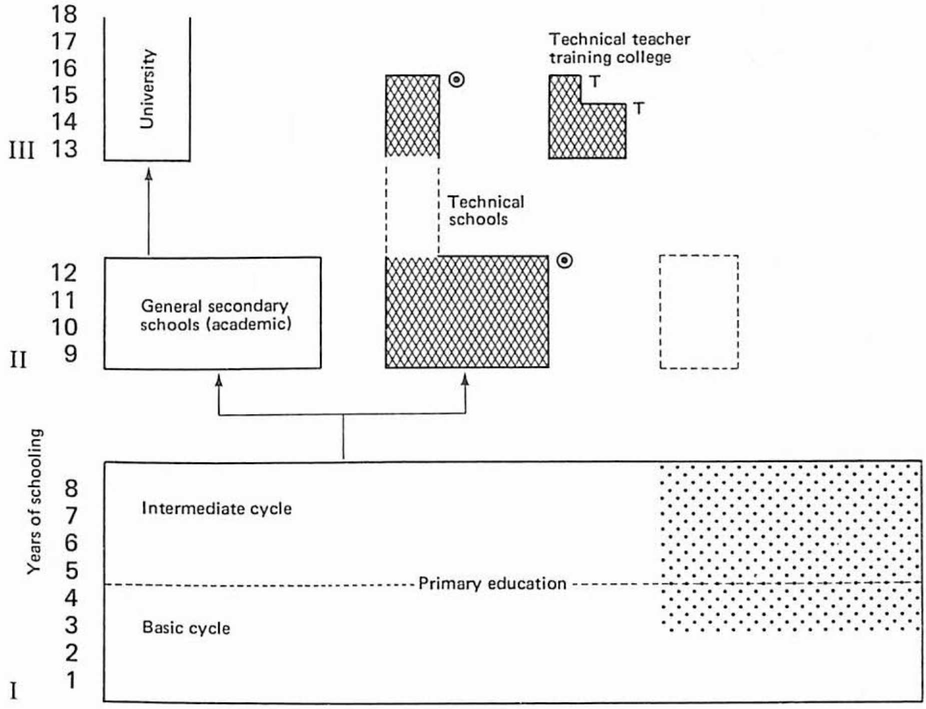

FIG. 3. Beginning with the third year of schooling, children in some schools are given an introduction to manual activities of a vocational type. These are continued with a more definite vocational bias in the three years of the intermediate cycle of primary education in some schools. As may be seen from the diagram, technical and vocational education within the regular educational system is directed to preparing middle and higher level technical personnel. Successful completion of the four-year secondary programme leads to the technical *bachillerato,* equivalent to the academic *bachillerato* which permits continuation in university. The technical *bachillerato* permits entrance to the three-year higher technician preparation programme at post-secondary level which has been created in one of the technical schools. Preparation for employment at skilled-worker or craftsman level takes place outside the school system in various vocational training and apprenticeship programmes. Technical teacher training is carried out in a special institution, the Escuela Normal Superior Técnica at post-secondary level.

Burma

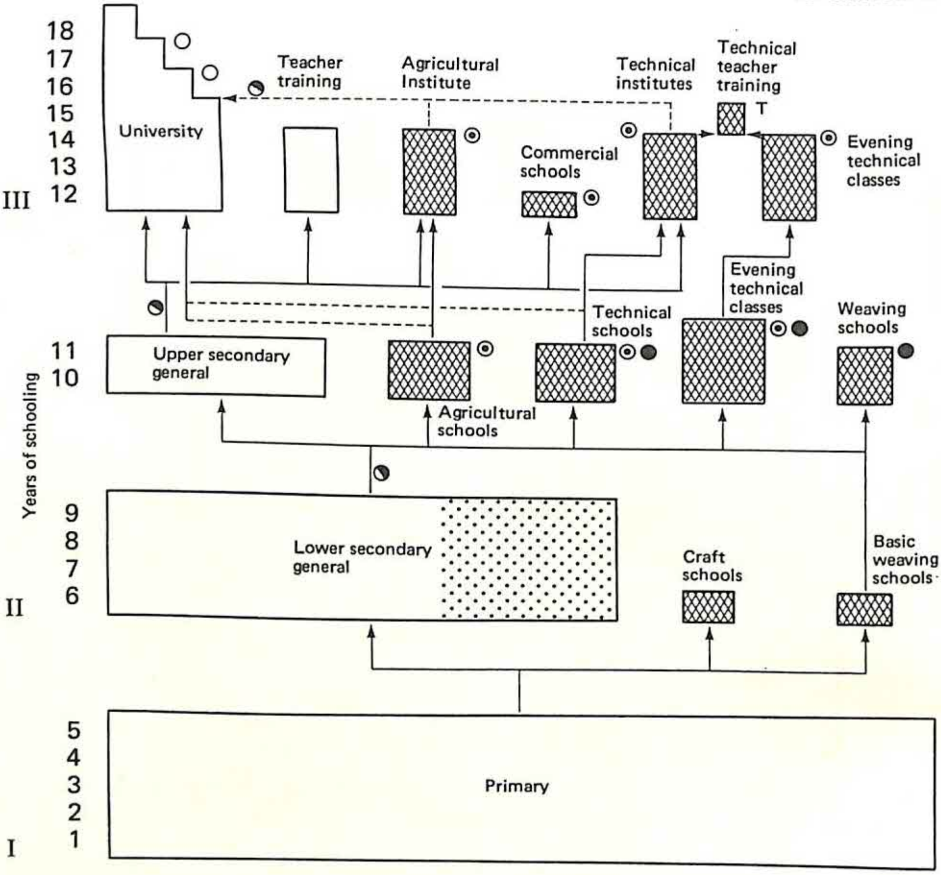

FIG. 4. The two major points of articulation in the educational system of Burma occur between the ninth and tenth years and between the eleventh and twelfth years of schooling and take the form of national examinations. At the first point, students either continue in general education or are channelled into specialized technical and vocational institutions. At the second point, graduates of higher secondary education are channelled into universities or the various post-secondary specialized institutions. It should be noted that there is provision for vocational training within the school system for primary leavers which takes the form of weaving schools or craft schools. Students in the upper secondary technical and agricultural institutions are prepared to enter the post-secondary specialized institutions. The brightest graduates from the upper secondary specialized schools may, however, be admitted directly to university level engineering or agricultural faculties. Graduates of post-secondary institutions may also enter appropriate university faculties if their performance on a special entry examination is sufficient. The evening technical classes given in various secondary and post-secondary technical institutions provide opportunities for employed workers to continue their education up to higher technician level and further, to become technical teachers.

Costa Rica

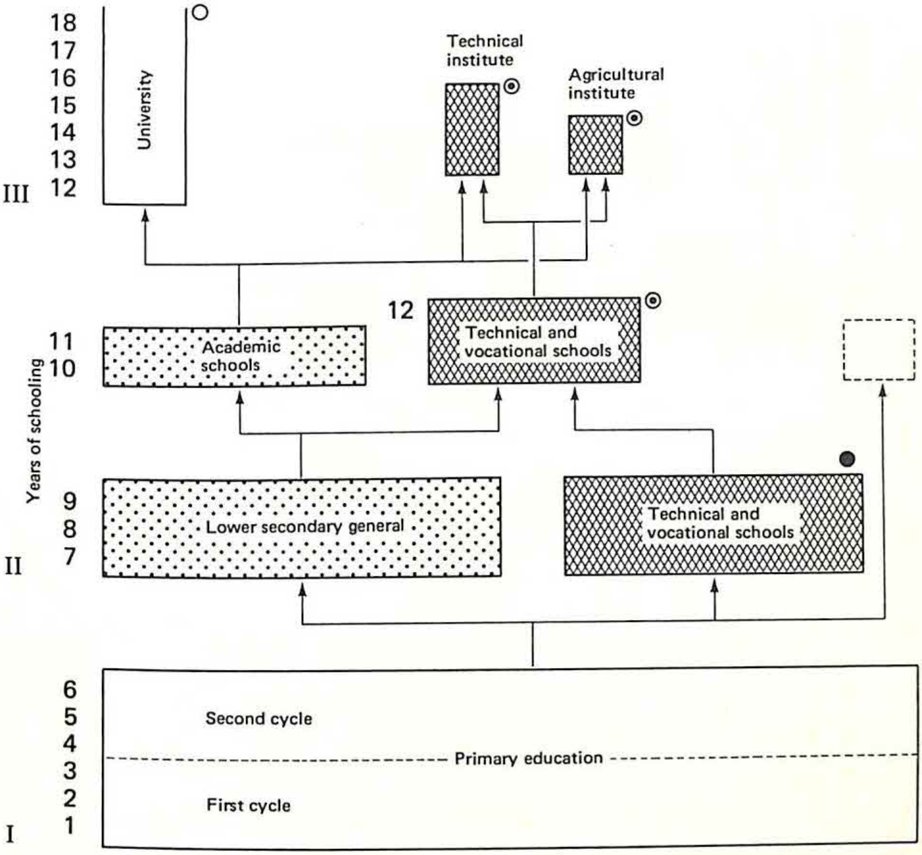

FIG. 5. Costa Rica has introduced general technical subjects in both the lower and higher secondary general schools which allow students to be admitted to upper secondary or post-secondary technical programmes. In this educational system separation into general programmes and vocational programmes may take place at a rather early stage, although the vocational programmes retain a large general education component. Apprenticeship and other training programmes exist outside the educational system for primary school-leavers. The first nine years of schooling are compulsory.

Ethiopia

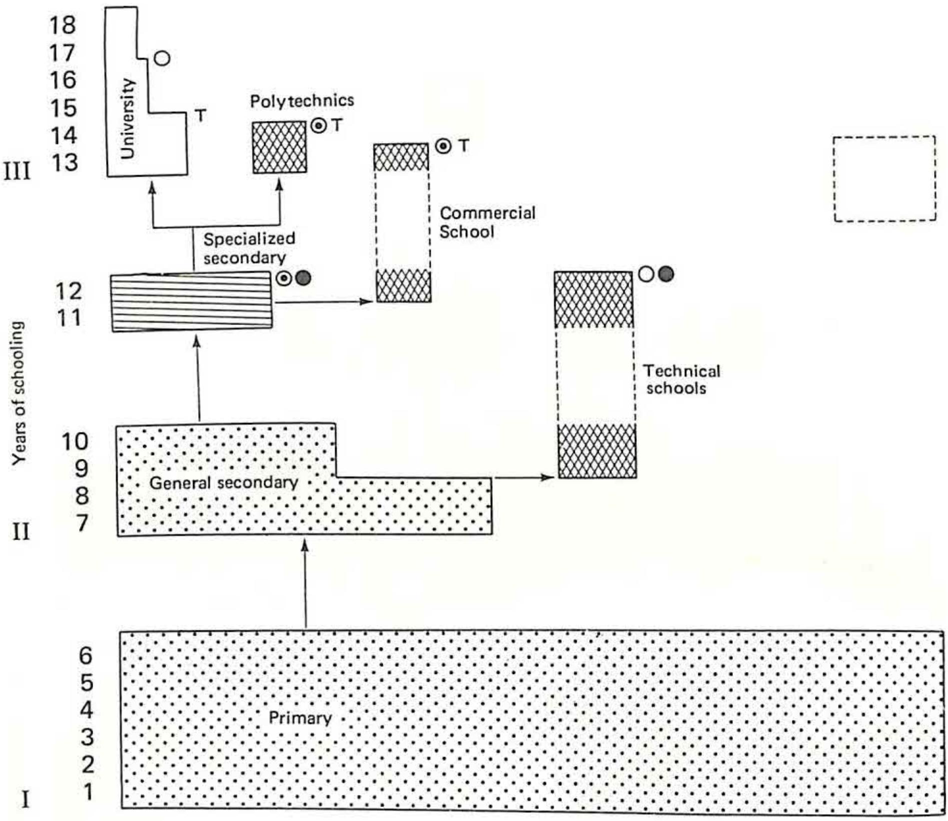

FIG. 6. The above diagram of the educational system of Ethiopia shows the importance placed on preparation for the world of work in that country. Technical and vocational aspects have been introduced at all levels of general education. Upper secondary education is being converted to a system of comprehensive education, alongside the further development of specialized technical and vocational schools. Training facilities under various agencies and ministries exist outside the formal school system in a number of fields.

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India

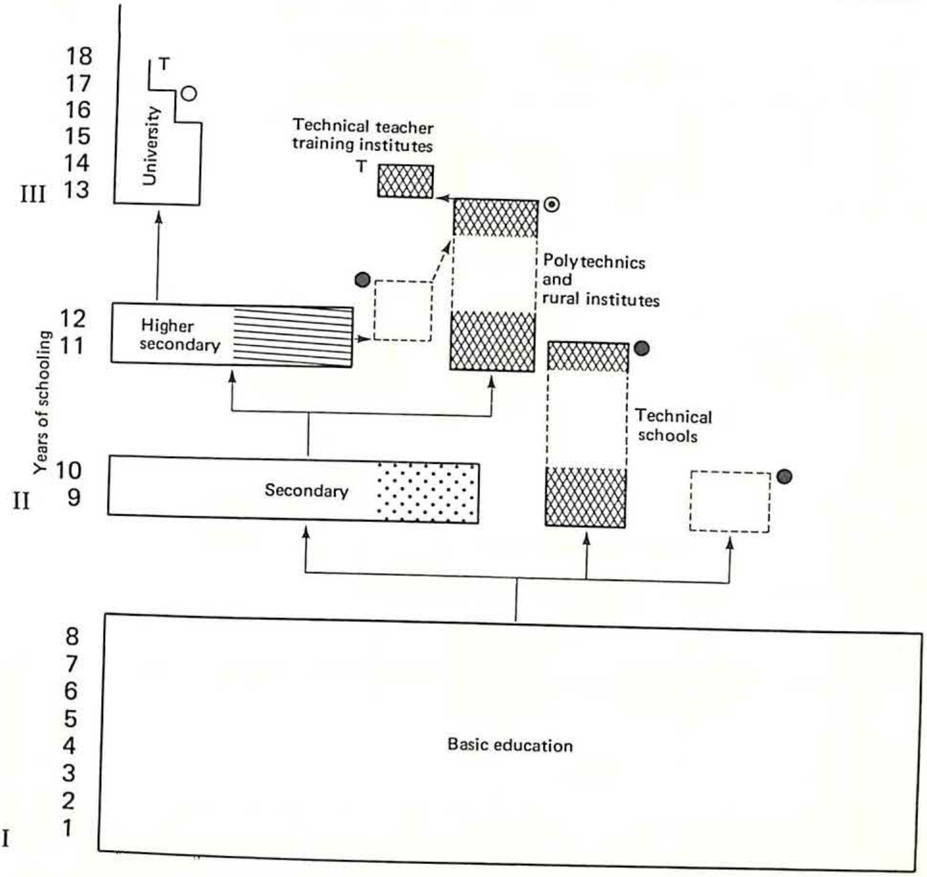

FIG. 7. It is difficult the provide an overall picture of the educational system of India given the diversity of the country and the fact that primary responsibility for education resides with the state governments. The above is a very schematic presentation of the way the system is now tending in terms of structural organization. Technical and vocational subjects are being introduced in the ninth and tenth years of schooling, and there is a definite trend towards the vocationalization of higher secondary education (eleventh and twelfth years of schooling). Although a number of training institutions exist outside the educational system, one type of institution is closely linked to it : the Industrial Training Institutes. These institutes provide a variety of programmes to train semi-skilled and skilled workers, and skilled artisans and craftsmen. Some of the programmes require eight years of schooling for entrance, others require eleven years.

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Ivory Coast

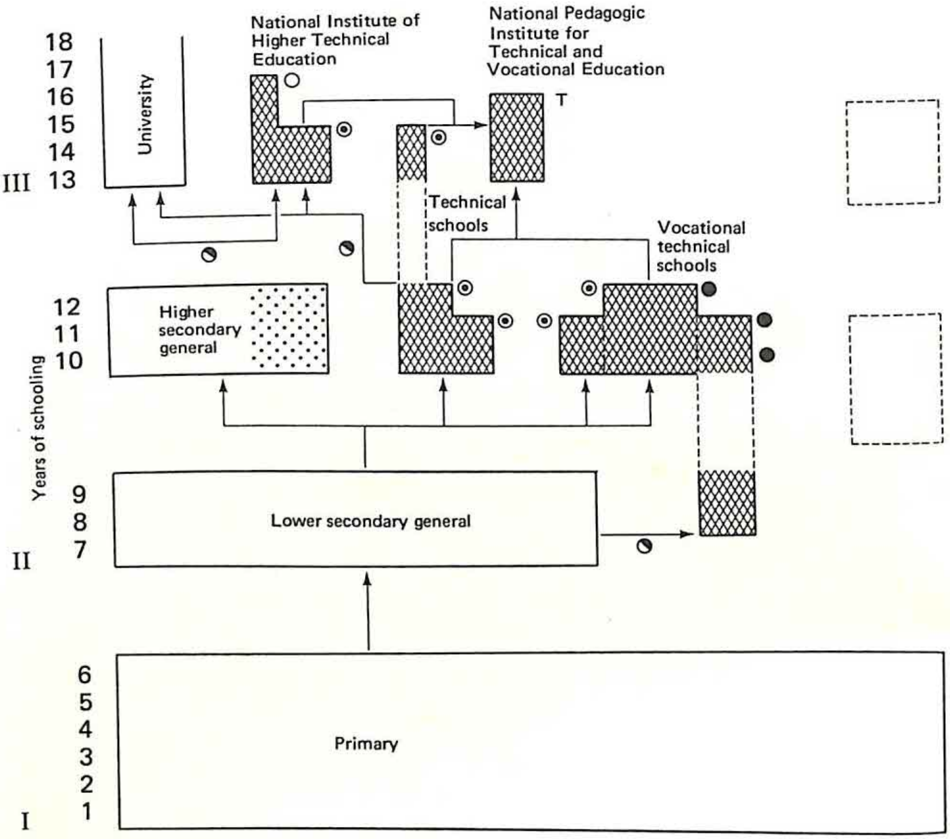
National Institute of Higher Technical Education
National Pedagogic Institute for Technical and Vocational Education
T
University
Technical schools
Vocational technical schools
Higher secondary general
Lower secondary general
Primary
Years of schooling
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
III
II
I

FIG. 8. The Ivory Coast is currently implementing overall reform of its education system designed to assure adequate preparation for employment and opportunities for promotion within employment for all, regardless of the point at which they leave the formal education system and regardless of the qualifications, academic or professional, they achieve within it. Two types of institution for technical and vocational education exist at upper secondary level in the Ivory Coast: the technical schools (*lycéees techniques*) offering technical preparation programmes at various levels and the vocational technical schools (*collèges d'enseignement technique*) which offer skilled worker and craftsman training programmes as lower level technician training programmes. On the higher education level, higher technical qualification commercial studies are offered in the largest technical school or within the university structure. In industrial fields, post-secondary technical preparation and engineering programmes have been brought together in one institution, the National Institute of Higher Technical Education (INSET). The major points of articulation within the educational system occur after the ninth year of schooling and after the twelfth year of schooling. At the first point students are channelled through a process of guidance. At the second point, entrance to higher education is determined by performance on

a national examination in the special field of study (baccalaureate). It should be noted that at lower secondary level, students may enter a vocational programme after seven years of schooling on the basis of an entrance examination. The Ivory Coast is developing a number of training institutions outside the school system at all levels of occupational qualification in order to train those leaving the educational system at any point for employment and in order to serve as institutions for continuing education.

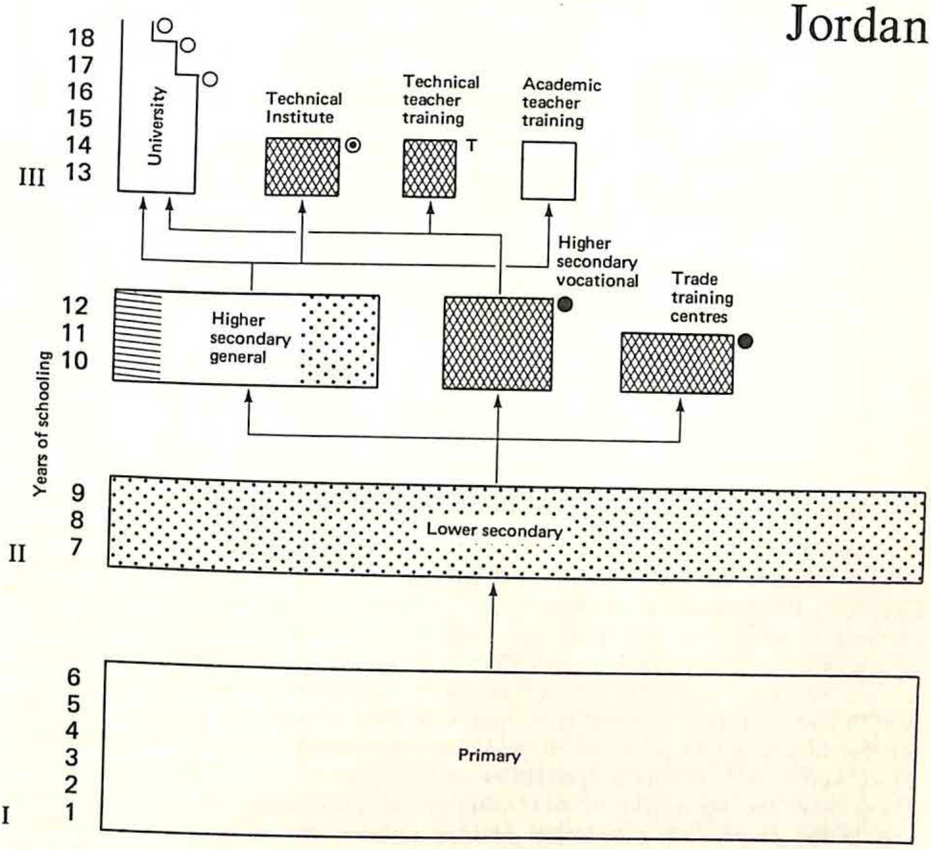

FIG. 9. In Jordan, the first nine years of schooling are compulsory, and technical and vocational subjects have been introduced as a required element in the lower secondary school curriculum. At upper secondary level, students are channelled into general education, vocational education or vocational training. Technical and vocational aspects are being introduced as a required element in academic secondary education, and the country is now initiating a comprehensive institutional organization for higher secondary education.

Kenya

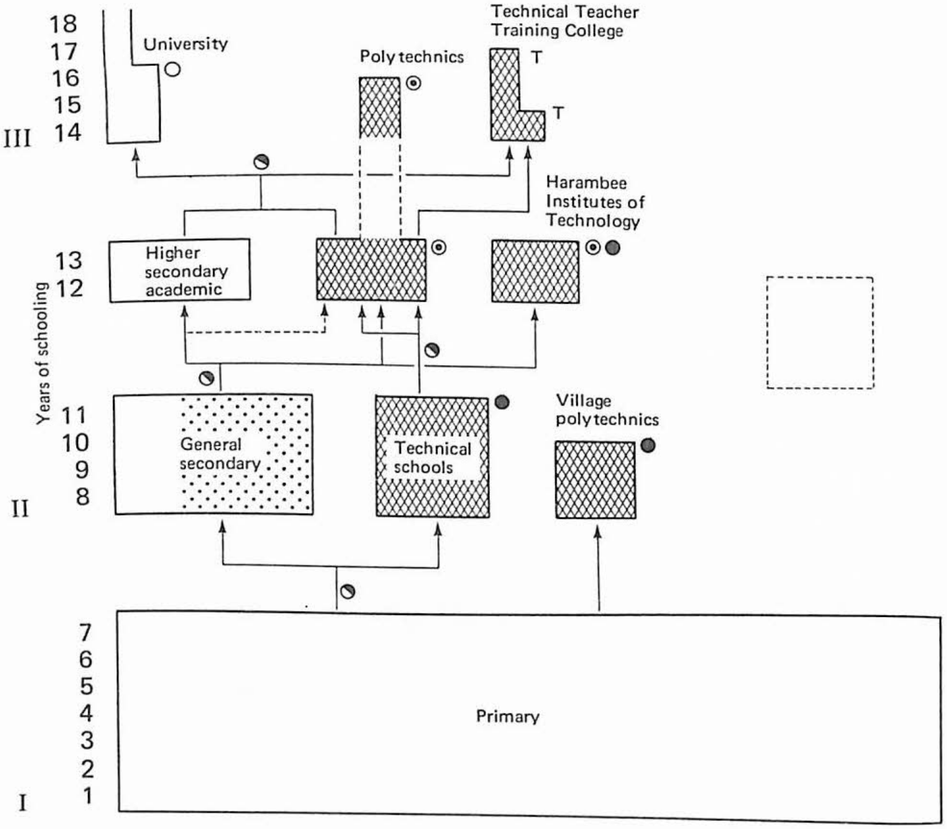

FIG. 10. There are three major points of articulation and selection in the Kenyan educational system. The first occurs with the Certificate of Primary Education Examination after seven years of primary schooling which determines entrance to secondary education. The second point falls after the eleventh year of schooling with the East African Certificate of Education Examination which is used to select students for the university preparatory programmes in the twelfth and thirteenth years of schooling. One such programme prepares students for the third selection point, the East African Advanced Certificate of Education Examination, with technical specialities and is given in one of the polytechnics. Those who are successful in this examination may either enter a university engineering faculty or a technical teacher training degree programme. Kenya is developing several types of training schemes outside the school system designed to give occupational preparation to those who do not pass the selection points within the educational system.

Republic of Korea

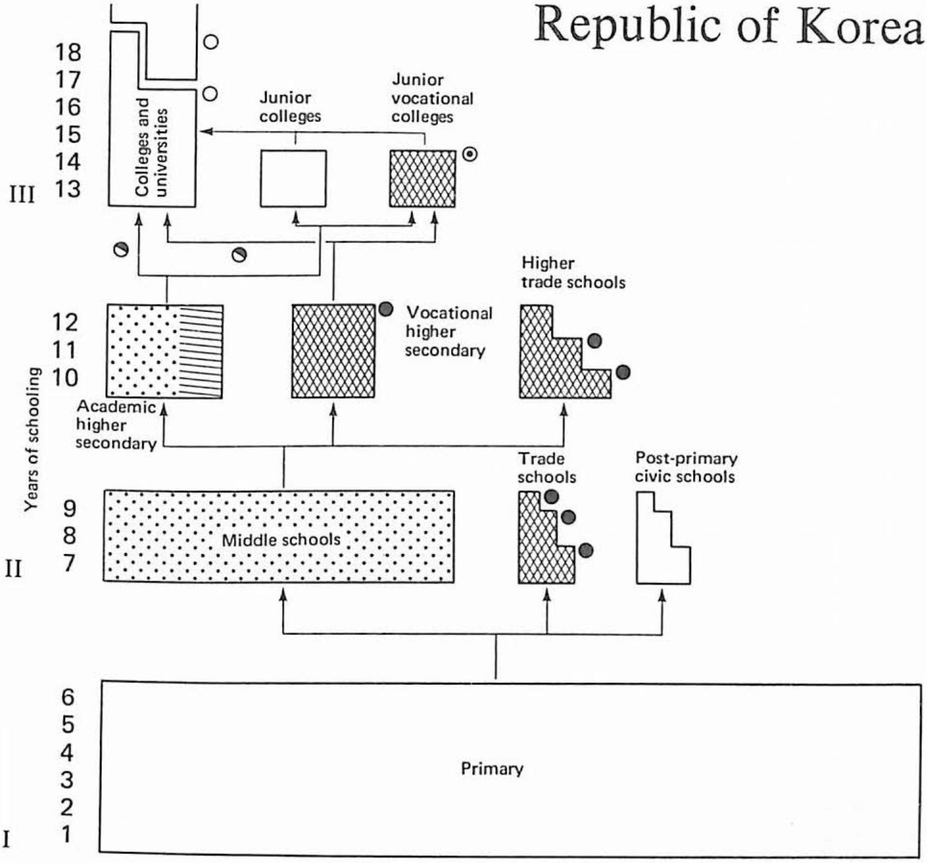
18
17
16
15
14
III 13
Colleges and universities
Junior colleges
Junior vocational colleges
Higher trade schools
12
11
10
Vocational higher secondary
Academic higher secondary
Years of schooling
Trade schools
Post-primary civic schools
9
8
II 7
Middle schools
6
5
4
3
2
I 1
Primary

FIG. 11. In the Republic of Korea, technical and vocational education is offered in several types of institution at upper secondary level: comprehensive schools, vocational schools, technical schools and trade schools. Those in academic upper secondary education are also required to continue some general technical and vocational studies which are compulsory for all at lower secondary level. The major point of selection occurs at the completion of twelve years of schooling with the National Preliminary College Entrance Qualification Examination (NPCEQE) which determines whether or not a student may take an entrance examination for college and university level studies in an institution of higher learning. Graduates of vocational schools and streams in comprehensive schools take a special category NPCEQE. Success in this examination may lead to admission to higher education in the field of study specialized in at secondary level. Such higher education is provided in university faculties on the basis of the secondary school record and the level of technical or vocational qualification achieved. In these cases the entrance examination is waived by the institution. The NPCEQE is not required for admission to the vocational junior colleges. Graduates of the post-secondary junior colleges may be admitted to degree programmes in the universities through special selection procedures. The junior colleges consist of teachers' colleges for primary school teacher training and comprehensive junior colleges but the latter are now being discouraged.

Liberia

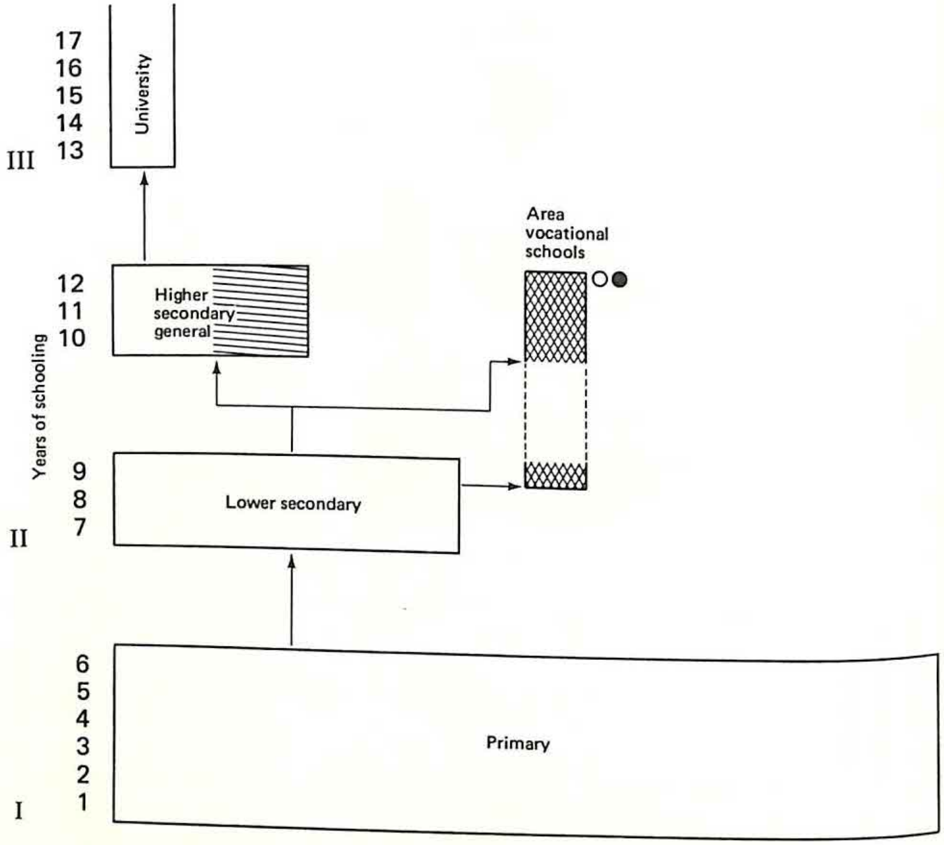

FIG. 12. In addition to the institutions indicated in the diagram, several vocational training institutions exist as well as private schools which offer commercial subjects on a part-time basis. Liberia is in the early stages of making provision for technical and vocational education within the educational system.

Malaysia

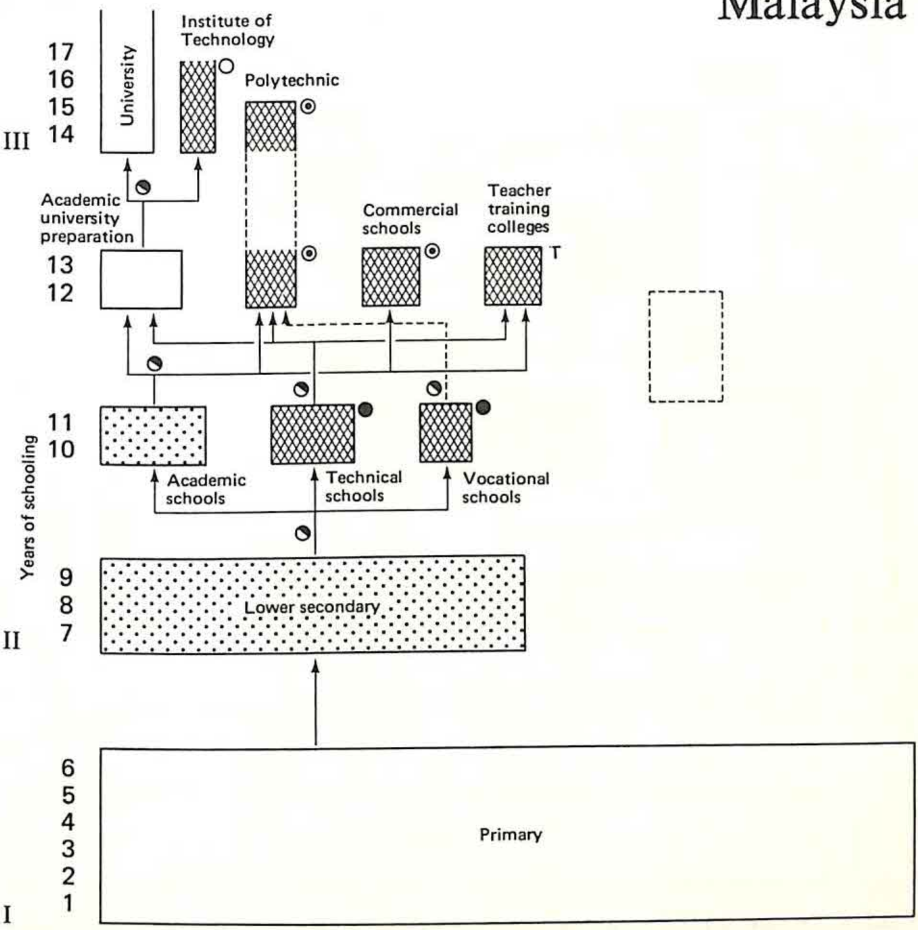

FIG. 13. The first point of selection in the Malaysian educational system occurs after nine years of schooling when students take the examination for the Lower Certificate of Education. Pupils who have an interest in, and an aptitude for, vocationally biased subjects may continue their education in the two-year vocational secondary schools which offer programmes usually terminal in nature, while others with an interest in more technical subjects may enrol in the technical schools. The second point of selection is found at the end of eleven years of schooling: students in academic and technical institutions take the examination for the Malyasian School Leaving Certificate. Performance in this examination determines whether students enter the two-year university preparation programme or continue their studies in specialized technical, commercial, teacher training or other institutions outside the formal system of education. The third point of selection, the examination for the Higher School Certificate, determines entrance into degree-level programmes at university or other institutions of higher education. A number of training institutions offering full-time technical and vocational training programmes exist outside the educational system under the authority of other ministries.

Nepal

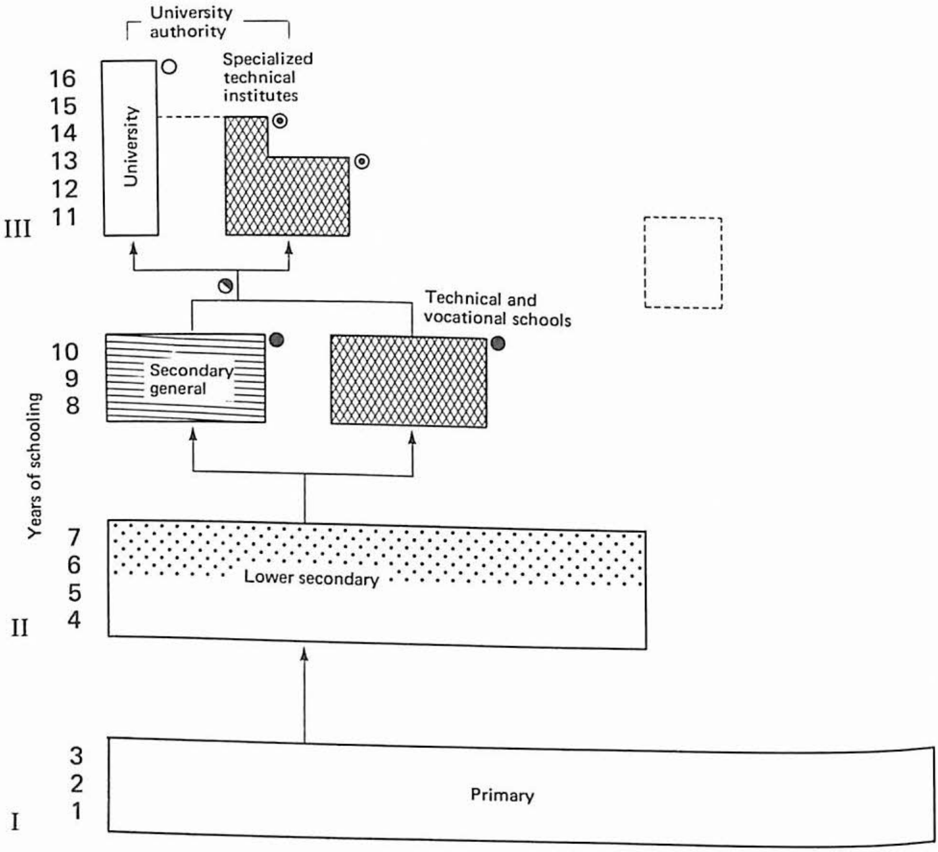

FIG. 14. In Nepal, after seven years of schooling students attend either secondary comprehensive schools or technically intensive schools. Both these types of school prepare young people to proceed either to higher education or to skilled employment. At the end of ten years of schooling, students take the National School Leaving Examination, after which they may proceed to higher education. Higher education in Nepal comes under a single authority, the University of Tribhuvan. Within this structure are the specialized technical institutes which prepare for ordinary and higher technician qualification. Several training institutions exist outside the structures of the education system, the most important of which train workers for the cottage industries.

Nigeria

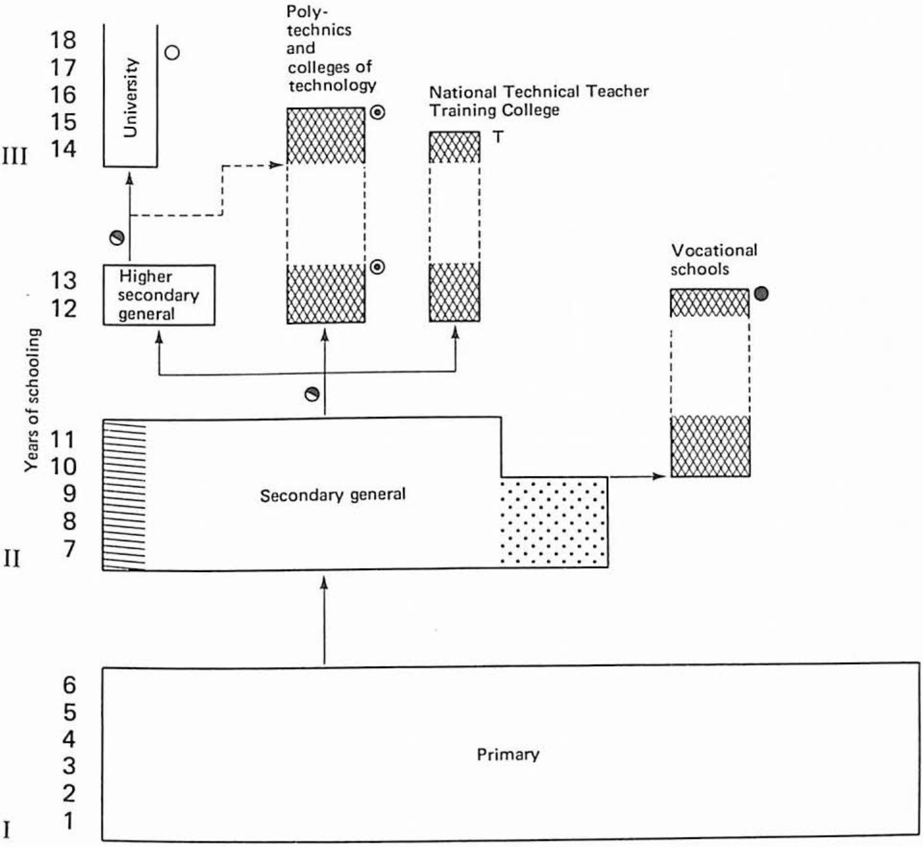

FIG. 15. The major points of articulation and selection in the Nigerian educational system occur after the eleventh and thirteenth years of schooling. After the eleventh year, students take the examination leading to the Secondary School Certificate which is required for entrance to higher secondary education, either general or technical. Students in the higher secondary general or university preparation programmes take an examination after two years which leads to the Higher School Certificate. Although secondary education is organized for the most part under the authority of the various state governments, the Federal Government is encouraging change to a comprehensive system of secondary education by creating multilateral schools with strong technical and commercial streams.

Panama

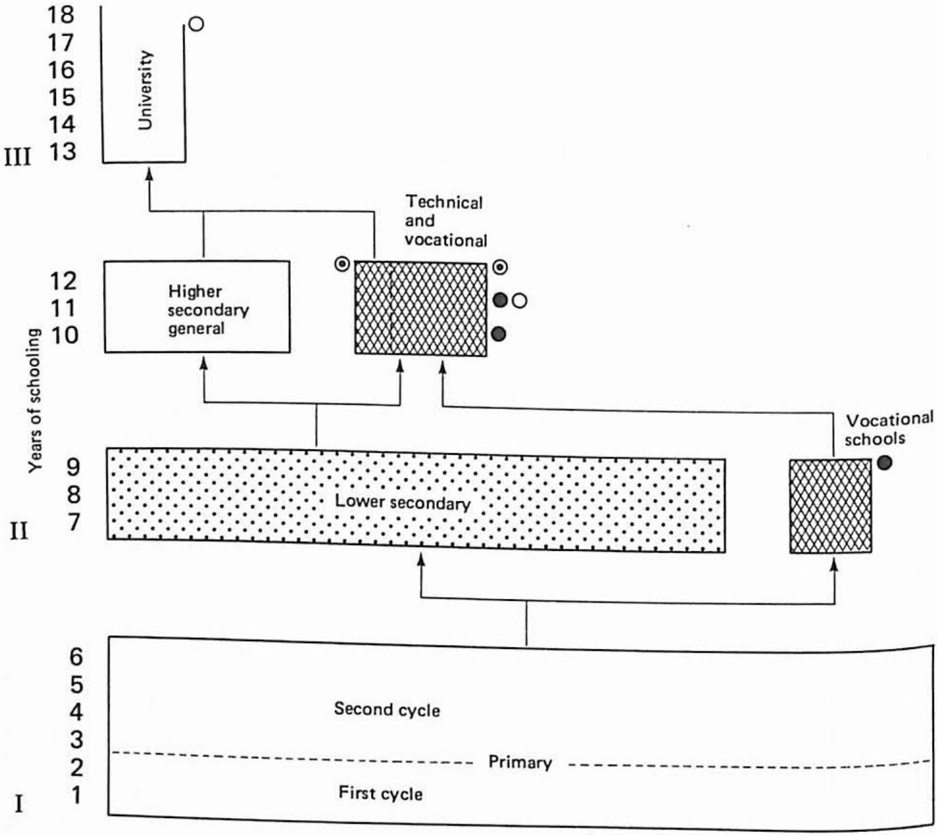

FIG. 16. In Panama, the first nine years of schooling are compulsory. With the exception of a few vocational schools, a basic curriculum is followed at lower secondary level whether in general education schools or in technical and vocational schools in which the second cycle of secondary education is also given. At the higher secondary level, students either continue in general education or enter technical and vocational programmes. Depending on the type of programme, these lead to qualification as a skilled worker, a lower level technician or a technician. There is also a programme at university preparation level leading to an industrial *bachillerato* or diploma which qualifies the student for entrance into a university engineering faculty.

Paraguay

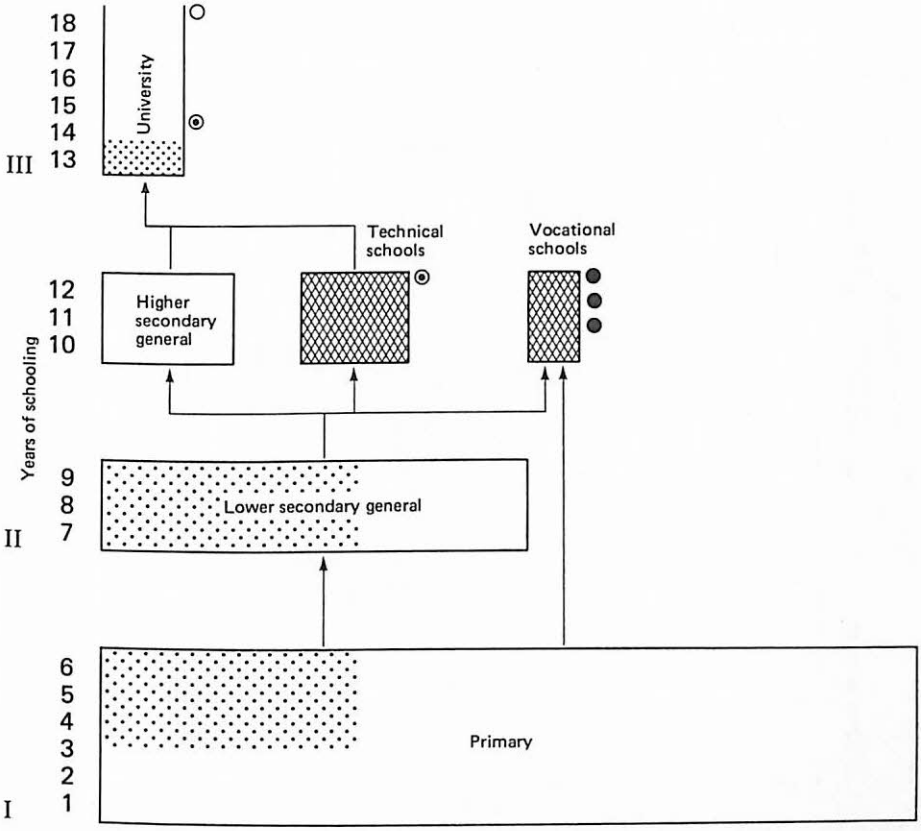

FIG. 17. The above diagram indicates the place of technical and vocational education within the structures now being created in Paraguay. Although the vocational schools which prepare skilled workers at various levels come under the responsibility of the Ministry of Education, these are considered to be outside the formal educational system. The technician preparation programmes at upper secondary level are designed to allow students either to enter employment or to pursue further studies at post-secondary level. When the post-secondary institutions are created for preparing higher technicians these will be incorporated into the university structure. Technical subjects and an introduction into the world of work are now established as an integral part of the required curriculum at upper primary and lower secondary level and this new curriculum is in the process of being implemented.

Sierra Leone

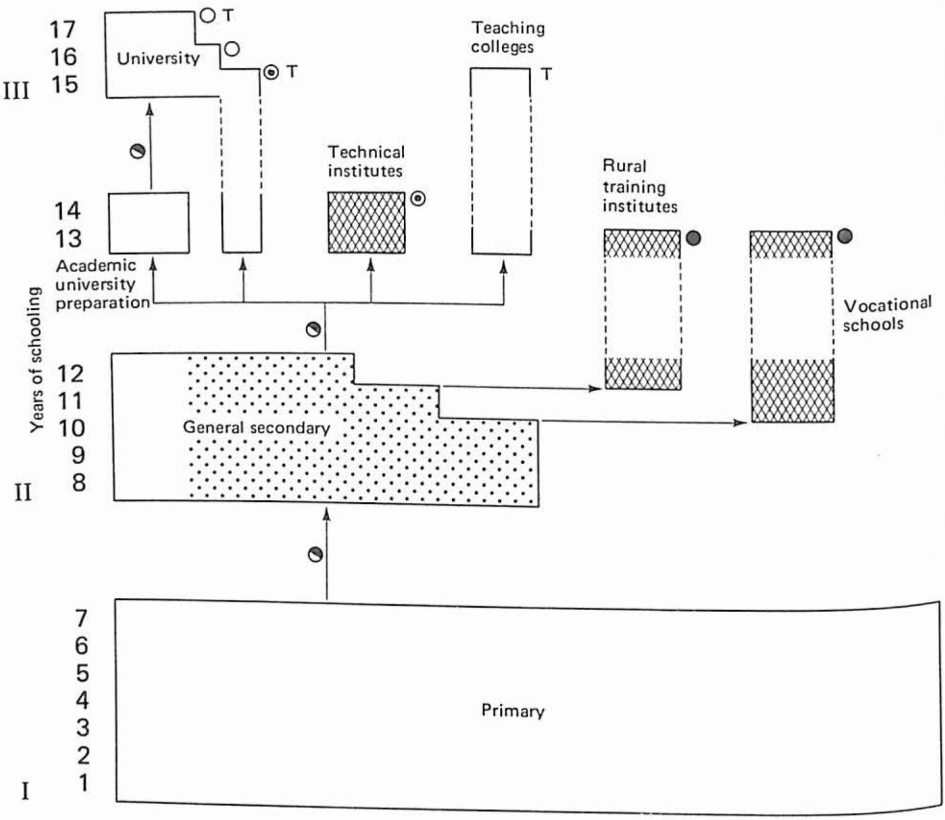

FIG. 18. There are three major points of articulation within the educational system of Sierra Leone. The first occurs at the end of seven years of schooling in the form of a Selective Entrance Examination or admission to general secondary education. After three years of general secondary education, students may move over to craft training programmes in the vocational schools and after four years of secondary education they may move over to agriculture and home-economics programmes in the rural training institutes. The second point of selection occurs after the twelfth year of schooling in the form of the West Africa Examination Council 'O'-level examinations. Depending upon performance in these examinations, students may enter the higher secondary academic university preparation programme, an engineering faculty, teacher training or the technical institutes. The technical institutes prepare ordinary level technicians, the engineering faculty both higher technicians and engineers.

Thailand

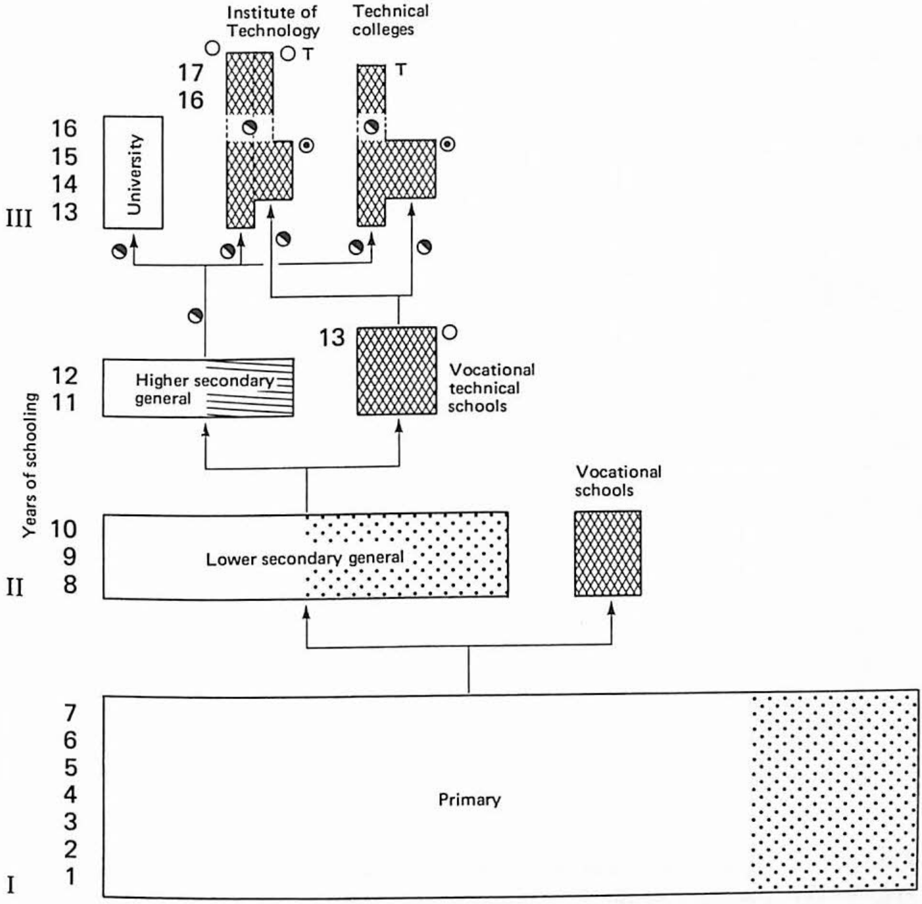

FIG. 19. In Thailand, vocational schools at lower secondary level are being phased out and at the same time programmes of work education introduced into the primary and secondary general school curriculum. Graduates of higher secondary general education take a national pre-university entrance examination before taking the selective entrance examination required for programmes of higher education. Graduates of technical and vocational higher secondary schools who have thirteen rather than twelve years of schooling may enter the second year of programmes of higher technical education upon successful performance in the selective entrance examinations. Before proceeding to the degree level or to technical teacher training programmes, students must take another selective examination.

Uganda

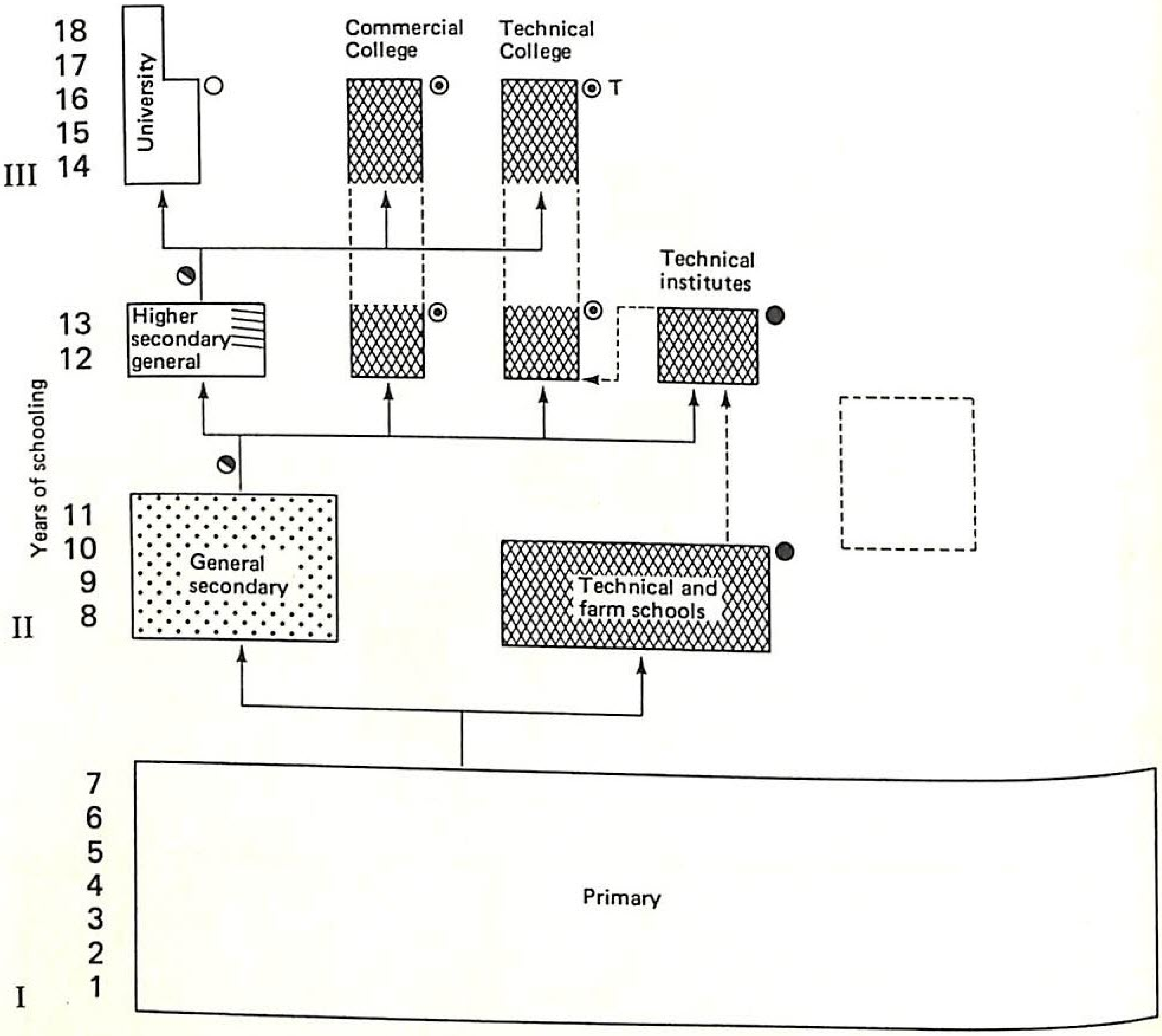

FIG. 20. In Uganda, the first major point of selection within the educational system takes the form of the East African Certificate of Education (EACE) Examination after eleven years of schooling. The second point occurs after the thirteenth year of schooling with the East African Advanced Certificate of Education Examination, performance in which determines entrance to university. The first opportunities for vocational education occur after the primary level or in the eighth year of schooling. Those not going on to general secondary education may go to the lower secondary technical and farm schools, which in fact take in the majority of primary leavers. Those who do very well in these programmes may later attend the technical institutes or upper secondary vocational schools, which offer a variety of craft and advanced craft courses. Technician preparation takes place at two levels: ordinary level, which requires two years of study after the EACE Examination, and higher level which requires a further three years of study. Most of these programmes are given on a part-time basis. Several types of training programmes exist outside the formal system, most of these directed to rural youth.

Upper Volta

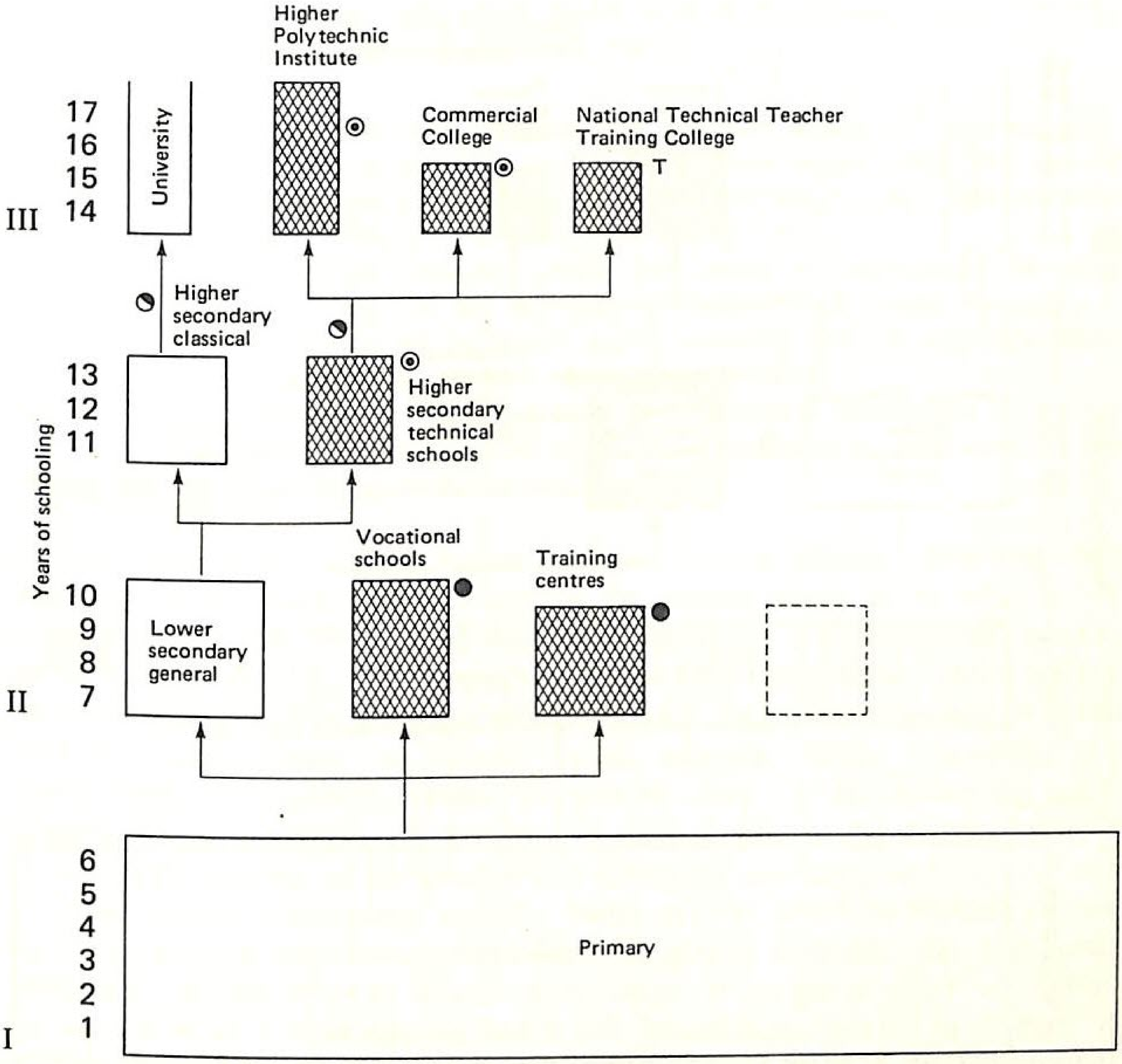

FIG. 21. After primary level in Upper Volta, young people continue the seventh year of their education in lower secondary general schools or in vocational schools and centres (*collèges d'enseignement technique* and *centres de formation professionnelle, centres d'apprentissage*). The latter prepare semi-skilled and skilled workers in three to four years. Following lower secondary general education after the tenth year of schooling, students continue in classical upper secondary schools (*lycées*) or higher secondary technical schools (*lycées techniques*). Following the thirteenth year of schooling, students in the *lycées* sit for examinations to obtain the diploma (baccalaureate), classical or technical, which gives access to higher studies. A number of training centres exist outside the school system, mostly for primary leavers in rural areas.

Uruguay

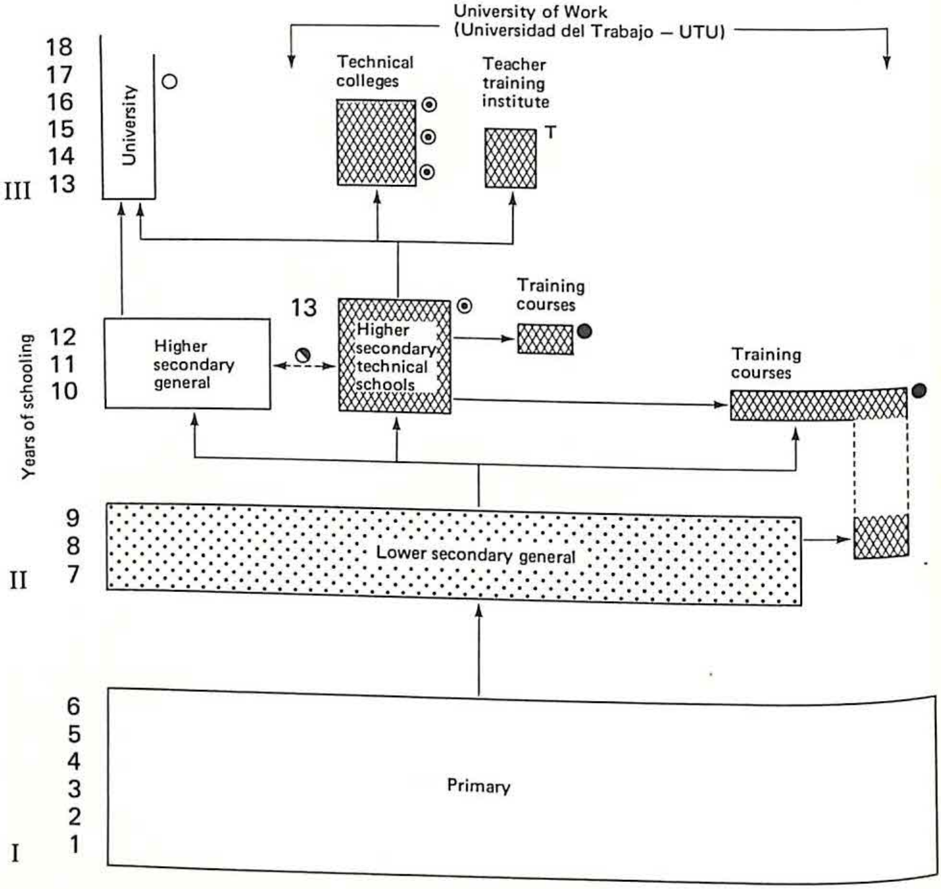

FIG. 22. Uruguay has reorganized its educational system and brought all forms of technical and vocational education under an autonomous educational authority: the University of Work (Universidad de Trabajo). Under this scheme, vocational training courses are provided at all levels for school leavers who do not obtain the academic and professional qualifications acquired on completion of programmes within the formal system. Ordinary technicians are prepared in the higher secondary technical schools in four-year courses beginning after the ninth year of general schooling. The length of upper secondary technical education is thus longer by one year than that of general secondary schooling. Students at upper secondary level may, if they succeed in the appropriate examinations, move laterally between general and technical education. The first nine years of schooling are compulsory.

In the section entitled 'Technical and Vocational Education in Relation to the Educational Process : Objectives' paragraph 6 of the Revised Recommendation deals with the objectives to be kept in mind with respect to the overall organization of the educational system :

> Given the necessity for new relationships between education, working life, and the community as a whole, technical and vocational education should exist as part of a system of lifelong education adapted to the needs of each particular country. This system should be directed to:
>
> (a) abolishing barriers between levels and areas of education, between education and employment and between school and society through :
>
> (i) the integration of technical and vocational and general education in all educational streams above primary level;
>
> (ii) the creation of open and flexible educational structures;
>
> (iii) the taking into account of individuals' educational needs and of the evolution of occupations and jobs; . . .

A later paragraph, coming under the section on 'Policy, Planning and Administration', makes several specific recommendations as to what kinds of structures would lead to the desired flexibility in the educational system as a whole: in brief, multi-purpose secondary education, open tertiary institutions devoted to purposes other than the award of university degrees and the establishment of suitable credit systems. While comparing the twenty-three educational systems in general terms in the following paragraphs, special attention will be given to those points in the various systems in which the criteria of integration and flexibility are being applied.

Most of the educational systems under review have introduced, or are in the process of introducing, some form of general technical and vocational education in the general school curriculum at upper-primary or lower-secondary level, a phenomenon which will be discussed further in Chapter 4 of this study. Thus a beginning is being made at this point in the educational system towards the integration of general and technical and vocational education. In some of the countries this education primarily serves general educational and orientation purposes. In others, it assumes the character of a pre-vocational preparation : it stresses practical skill development which will allow primary school leavers and lower secondary school drop-outs and leavers a better chance of finding gainful employment or entering into some form of training. As a corrollary of this development, the reports indicate de-emphasis or a complete phasing out of purely vocational schools at lower-secondary level. The structures are, therefore, in place or in the process of being created which will offer the same opportunities to all through a common basic education of eight to ten years' duration, which includes introductory technical and vocational subjects.

The integration of general and technical and vocational education at upper-secondary level tends to fare less well. It is at upper-secondary level that specialization begins in most systems, and, as may be seen from the diagrams, this specialization often corresponds to institutional separation.

Where general and technical and vocational education are institutionally separated, there are generally fewer opportunities for higher education for the graduates of the latter institutions.

Two major patterns may be distinguished with regard to the organization of general and technical and vocational education at upper secondary level:

1. Institutional separation of academic and technical and vocational education. Afghanistan, before the reform, Bolivia, Burma, Costa Rica, Ivory Coast, Kenya, Panama, Paraguay, Upper Volta and Uruguay conform to this pattern.
2. A mixture of comprehensive upper secondary education and separate specialized institutions is the pattern found in the educational systems of Bangladesh, Ethiopia, India, Jordan, the Republic of Korea, Liberia, Malaysia, Nepal, Nigeria, Sierra Leone, Thailand and Uganda. This pattern will prevail in Afghanistan after the reform.

There is a definite trend in 50 per cent of the countries considered to introduce technical studies into institutions and programmes which are traditionnally academic in character — in other words, to render these institutions more comprehensive in nature. Examples are Bangladesh, Ethiopia, India, Jordan, Liberia, Malaysia, Nepal, Nigeria, Sierra Leone, Thailand, Uganda and Afghanistan in the future. This has been achieved by introducing technical subjects in the academic curriculum which may then be chosen as an examination field in the academic qualifying examinations or credited in other ways for entrance to higher education, either academic or technical. This trend thereby enlarges the opportunities for students in academic institutions as well as the recruitment possibilities for post-secondary technical education, and in general serves the purpose of de-emphasizing the concept of higher secondary education as solely geared to university entrance. Such trends are to be strongly encouraged, particularly where there is high unemployment among graduates of academic secondary education who are not admitted to university and/or where there is a certain stigma attached to being a student in a technical/vocational upper secondary institution.

The technical subjects incorporated in this fashion into the traditional academic examination structures rarely prepare for employment those who choose not to continue their studies since the emphasis is more often on theory than practice. In contrast, while the graduates of institutions devoted exclusively to technical and vocational education might be adequately prepared for employment (although this is not always the case), the general education component of their programmes rarely qualifies them for the full range of choice for higher education.

The integration of general and technical and vocational education is closely tied to questions of flexibility in structures. Looking at the points of articulation within the various systems diagrammed above, it is evident in most countries that those completing programmes in academic institutions or programmes in comprehensive institutions, whether academic or with a technical or vocational bias, have a far greater range of educational choice available to them. Conversely, those completing programmes of technical and vocational education in institutions designed specifically for that purpose have for the most part only limited routes open to them.

In addition to developing educational structures which are comprehensive in conception, a number of countries are taking another approach to increasing the flexibility of their educational structures. These countries are working out new points of articulation, both horizontal and vertical, within the system, which broaden educational opportunity for those following programmes in specialized technical and vocational institutions :

Bangladesh

As the broken arrows in the diagram indicate, it is possible for graduates of vocational institutes which normally offer terminal programmes to take the secondary school certificate examination for entry to technical institutes with programmes leading to a post-secondary level diploma, and from these institutes to enter a university engineering faculty.

Burma

Graduates of post-secondary technical and agricultural institutes may take a special qualifying examination for entrance to university engineering and agricultural faculties.

India

Those completing two-year lower secondary general education may transfer to a technical high school for a third year of study and qualification as a craftsman. Normally, entrance to the technical high schools takes place earlier, after eight years of basic education. Early leavers from the vocational streams of higher secondary education who successfully complete an industrial training scheme may also enter directly the third and final year of programmes in the polytechnics leading to a technician's diploma.

Kenya

Normally, entrance to the Technical Teacher Training College takes place immediately on achievement of the Ordinary Technicians Diploma after thirteen years of schooling. Those who achieve only a technician's certificate following this course may, however, enter the technical teacher training college after one year of employment.

Republic of Korea

The normal route to university is directly after twelve years of schooling and success in the National Preliminary College Entrance Qualification Examination. However, those having completed two-year programmes in junior colleges which do not require the NPCEQE for entrance may enter the third year of degree programmes in the field they studied at junior college through a brief National College Transfer Qualification Examination and a special screening process.

Malaysia

The most outstanding students completing programmes in the vocational upper secondary schools which are usually considered terminal may go into diploma-level and certificate-level technician training programmes in technical institutes.

Sierra Leone

A special one-year preliminary course has been developed which allows students who do not pass the 'O'-level exams which normally give access to higher secondary and post-secondary education to enter the programme leading to the Ordinary Technician Diploma. Students with lower level passes on the 'O'-level exams also have access to technical diploma programmes within the university framework.

Uganda

Some graduates of lower level (grades VIII-X) vocational schools (technical or agricultural) which offer terminal programmes may be accepted into craft programmes in the upper secondary technical institutes although entry to these usually requires completion of general secondary education after eleven years of schooling and passing the East African Examination Council 'O'-level exam.

Uruguay

At upper-secondary level, two-way horizontal passages have been created between academic and technical education.

The routes opened to students in technical and vocational specialized institutions in the cases noted above are of four types. Bangladesh, Burma and the Republic of Korea have instituted more flexible points of articulation between post-secondary technical institutions and university engineering and other technical faculties. Sierra Leone has created a new point of articulation between secondary technical and post-secondary technical education for the lower performers. New routes between normally terminal secondary vocational programmes and upper secondary and post-secondary technical education have been created by Bangladesh, India, Kenya, Malaysia and Uganda. Finally, two-way horizontal articulation between secondary academic and technical education has been instituted in Uruguay.

The educational structures of the twenty-two countries illustrate the direct relationship between educational opportunity and integration of general and technical and vocational education, on the one hand, and flexibility of structure, on the other. The number of educational opportunities available are in direct proportion to the extent to which general and technical education are integrated. At the critical points of selection within each system, those completing either academic education or general education programmes with a technical or vocational bias have far more educational opportunity open to them than those completing specialized programmes. Those completing specialized programmes have more immediate employment opportunities than those completing general education programmes and not pursuing further studies. For the most part, however, the structures are not yet in place for continuing education which would eventually allow this group to rejoin the education system at a later date for professional change or promotion. Since these structures require more complex organization and close co-ordination between education and employment, most countries concerned in this study have chosen to direct initial efforts in the creation of a system of lifelong education towards reforms in the formal education system itself which expand educational opportunities prior to employment.

In conclusion, the patterns of educational organization vary from country to country, but in most cases general education is from eight to ten years in length, after which specialization takes place at upper-secondary level, and eleven to thirteen years of schooling are required for entrance to higher education. There is, further, a definite trend towards the introduction of comprehensive secondary education and the creation of alternative routes within the educational system, although on the whole these are in the early stages. The expansion of post-secondary technical education opportunities may also be identified as a major trend with the dual consequence of offering alternatives to academic higher education for academic secondary school graduates and of offering broader opportunities to graduates of upper secondary technical education.

3 Policy, planning and administration

S.C.E.R.T., West Bengal
Library
Calcutta
25/3, B. C. Road

From the country reports under study it is clear that the twenty-three countries consider policy and planning with regard to technical and vocational education to be of fundamental importance in national educational development policy as well as in development policy as a whole. Furthermore, a consensus exists as to the two major policy goals for technical and vocational education and these goals, which may be summed up as follows, are in accordance with the Revised Recommendation:[1]

1. Technical and vocational education should be geared to fulfilling the manpower requirements for economic development and the social requirements for employment.
2. Technical and vocational education should be developed in such a way as to provide broader educational opportunities for an increasing proportion of the population.

All recognize that the achievement of these goals requires careful planning and the creation of the necessary legislative, financial and administrative structures. In many countries, these structures remain ill-defined, even though a general policy may have been adopted; in others they are now in place but their full and efficient functioning is not yet fully attained.

The implementation of educational policy, and in particular policy regarding technical and vocational education, requires structures within which responsibility is clearly allotted for five essential functions. These functions may be summarized as:

1. General administration and institutional management.
3. Co-ordination, both internally within the educational administrative structures and externally with manpower planning and employment.
4. Research and evaluation.
5. Supervision to ensure that the system functions smoothly and that established standards are being met.

A comparison of the structures through which these functions are carried out in the various countries not only illustrates solutions currently being worked out in developing countries, but also highlights certain problems involved in policy implementation through the general organization and management of technical and vocational education.

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[1] See Section III, 'Policy, Planning and Administration', of the 'Revised Recommendation concerning Technical and Vocational Education', on pages 118-20.

Financial resources are an obvious factor determining how well and how rapidly policy may be implemented, and lack of such resources is one of the major, and often the major, barrier to implementation of change and reform. A comparison of allocation of resources to, and costs for, technical and vocational education underlines the problem facing most developing countries, namely, on the one hand, the need to bring down costs for technical and vocational education and, on the other, the necessity for hard decisions concerning allocation of available funds in line with the priority given to the development of technical and vocational education.

A number of the countries concerned provided information which allows the overall administrative structures of technical and vocational education to be described, in more or less detail, in graphic form. These are presented in Figures 23-36. Where the information permits, responsibility for the above five functions is shown according to the following key:

Key to Figures 23-36

▭	Responsibility for general administration and institutional management of technical and vocational education
▤	Planning function
░	Co-ordination function with manpower planning and employment
▥	Research and evaluation function
▦	Supervisory function
┈┈┈┈┈┈	Lines of co-ordination: (a) within educational structures
— — — -.	(b) between education and manpower planning and employment
---------	Lines of attachment between administrative bodies and semi-autonomous or advisory bodies

Afghanistan

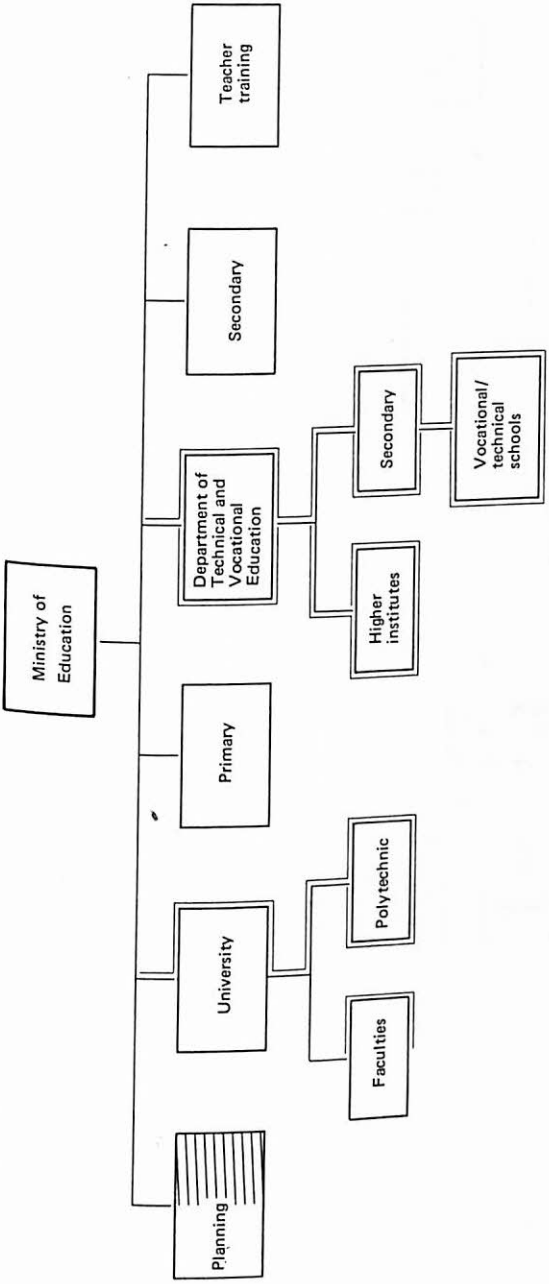

FIG. 23.

Bangladesh

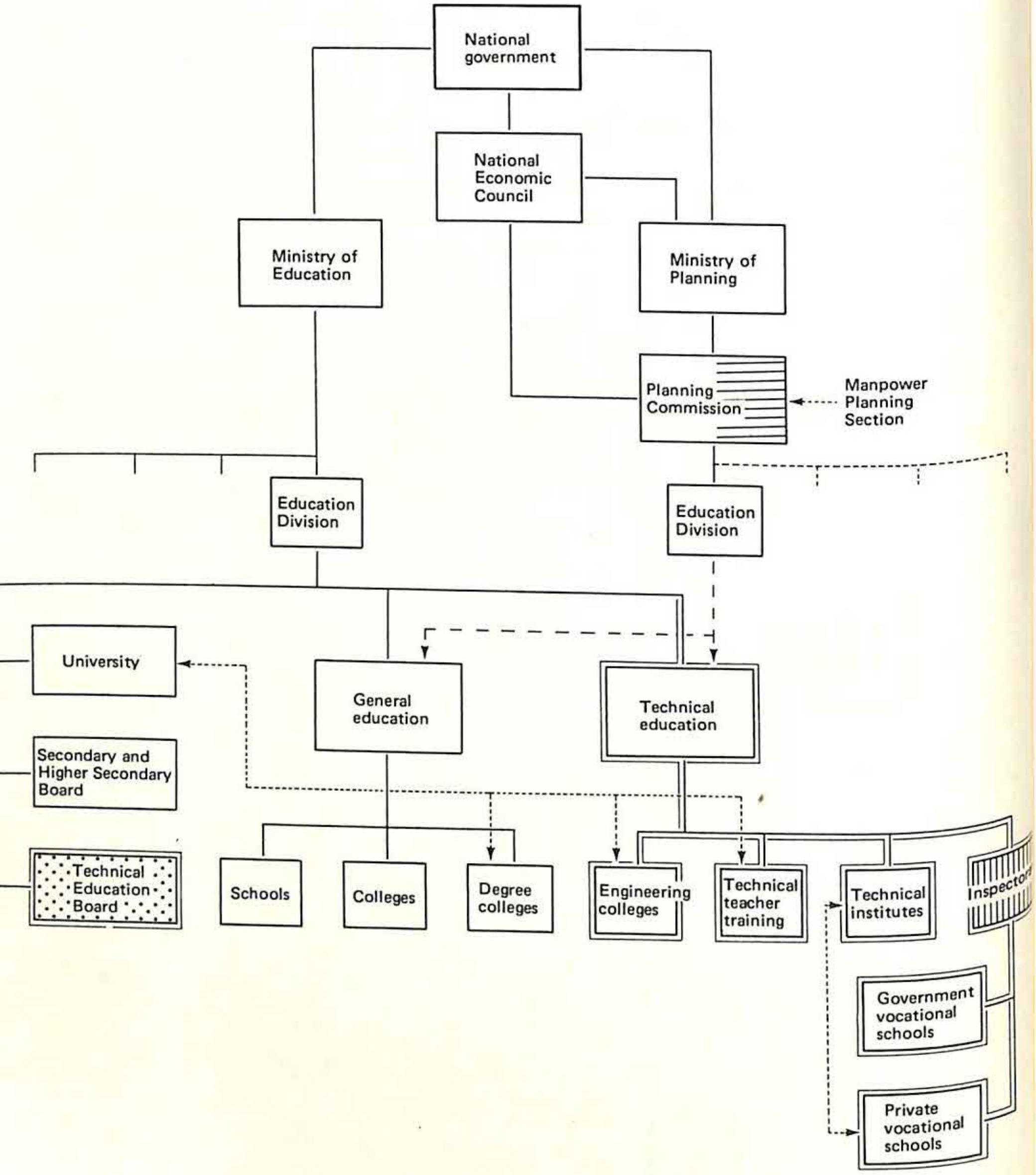

FIG. 24.

Burma

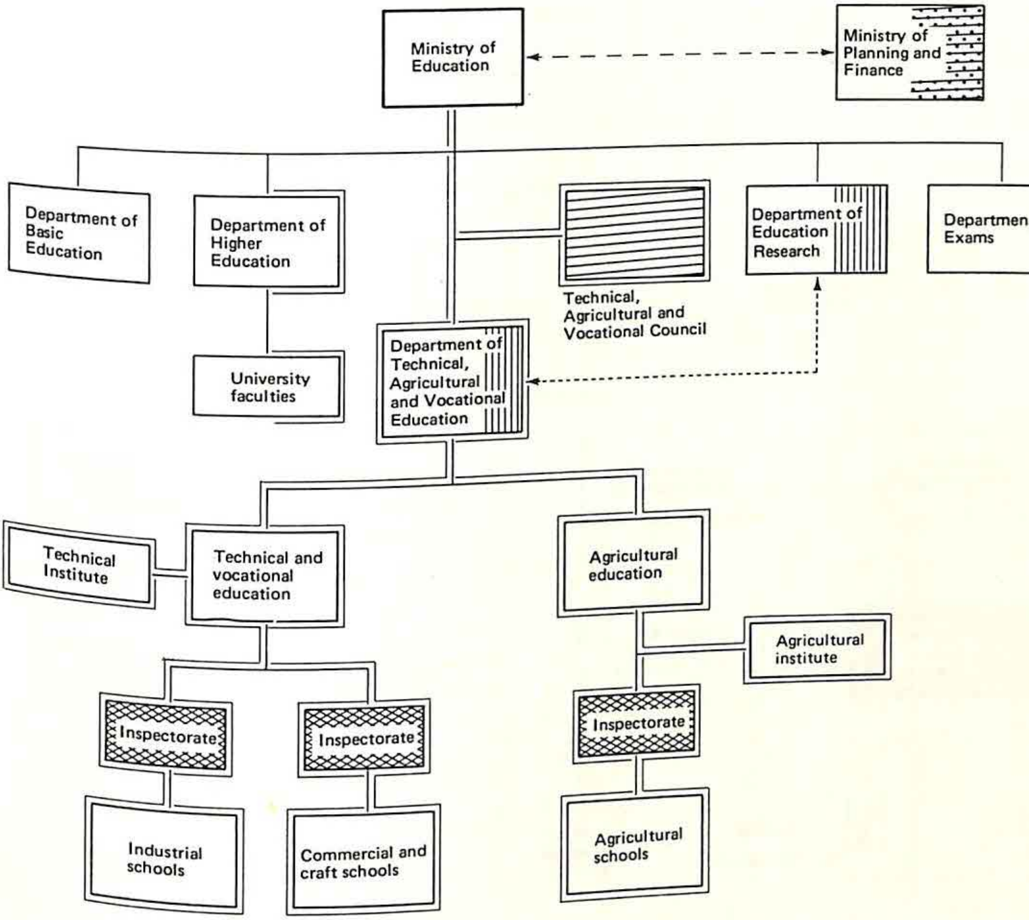
Ministry of Education
Ministry of Planning and Finance
Department of Basic Education
Department of Higher Education
University faculties
Technical, Agricultural and Vocational Council
Department of Education Research
Departmen
Exams
Department of Technical, Agricultural and Vocational Education
Technical Institute
Technical and vocational education
Agricultural education
Agricultural institute
Inspectorate
Inspectorate
Inspectorate
Industrial schools
Commercial and craft schools
Agricultural schools

FIG. 25.

Ethiopia

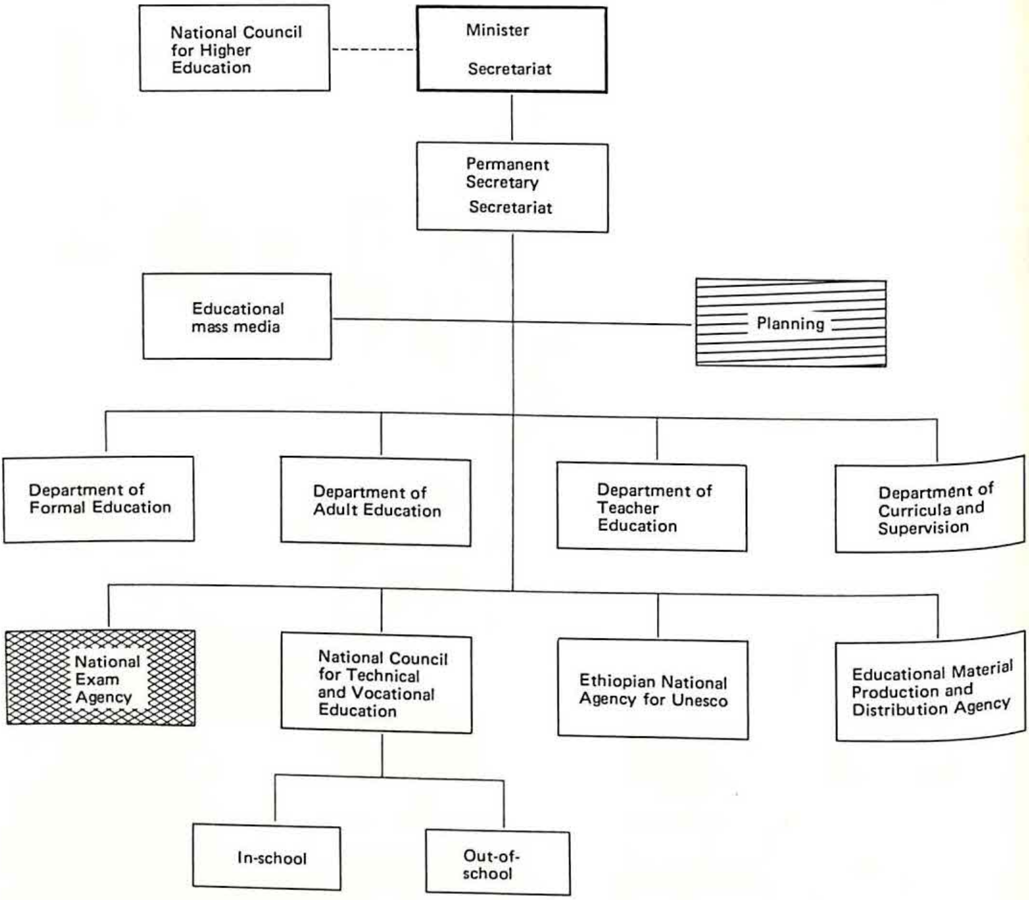
National Council for Higher Education
Minister
Secretariat
Permanent Secretary
Secretariat
Educational mass media
Planning
Department of Formal Education
Department of Adult Education
Department of Teacher Education
Department of Curricula and Supervision
National Exam Agency
National Council for Technical and Vocational Education
Ethiopian National Agency for Unesco
Educational Material Production and Distribution Agency
In-school
Out-of-school

FIG. 26.

India

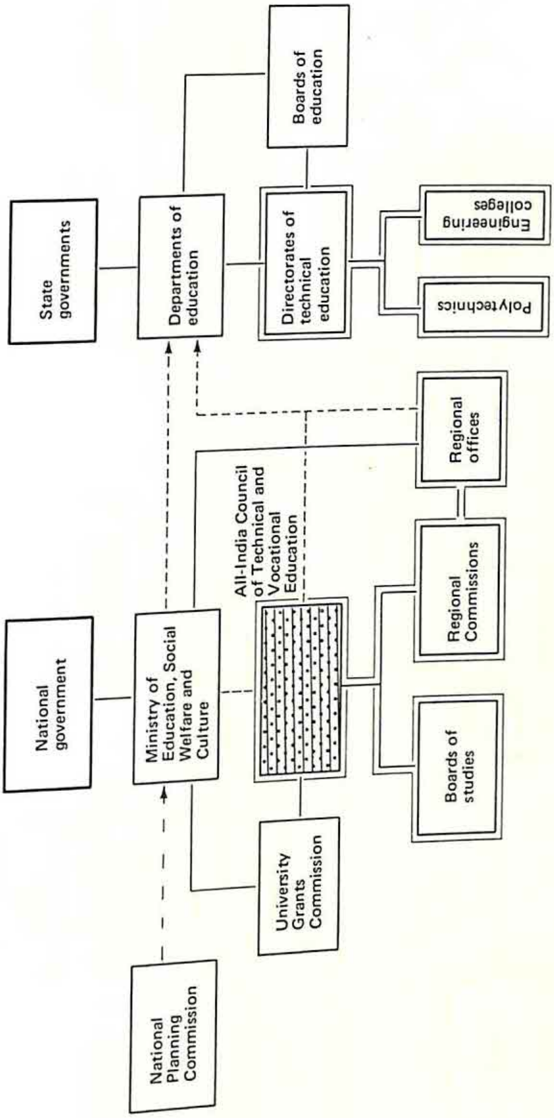
National government
Ministry of Education, Social Welfare and Culture
National Planning Commission
University Grants Commission
All-India Council of Technical and Vocational Education
Boards of studies
Regional Commissions
Regional offices
State governments
Departments of education
Boards of education
Directorates of technical education
Polytechnics
Engineering colleges

FIG. 27.

Ivory Coast

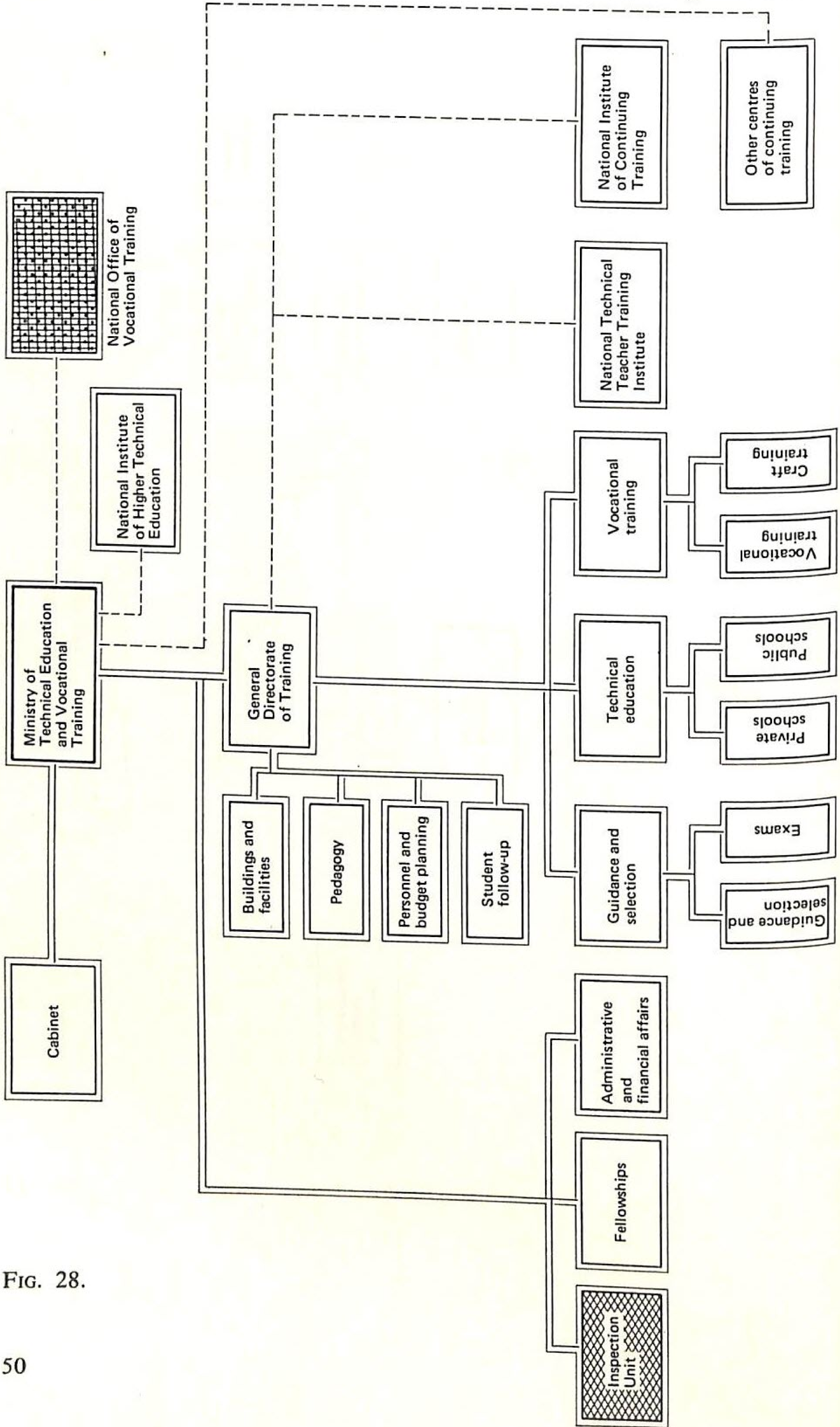
Cabinet
Ministry of Technical Education and Vocational Training
National Office of Vocational Training
National Institute of Higher Technical Education
General Directorate of Training
Buildings and facilities
Pedagogy
Personnel and budget planning
Student follow-up
National Institute of Continuing Training
Other centres of continuing training
National Technical Teacher Training Institute
Vocational training
Craft training
Vocational training
Technical education
Public schools
Private schools
Guidance and selection
Exams
Guidance and selection
Administrative and financial affairs
Fellowships
Inspection Unit

FIG. 28.

Republic of Korea

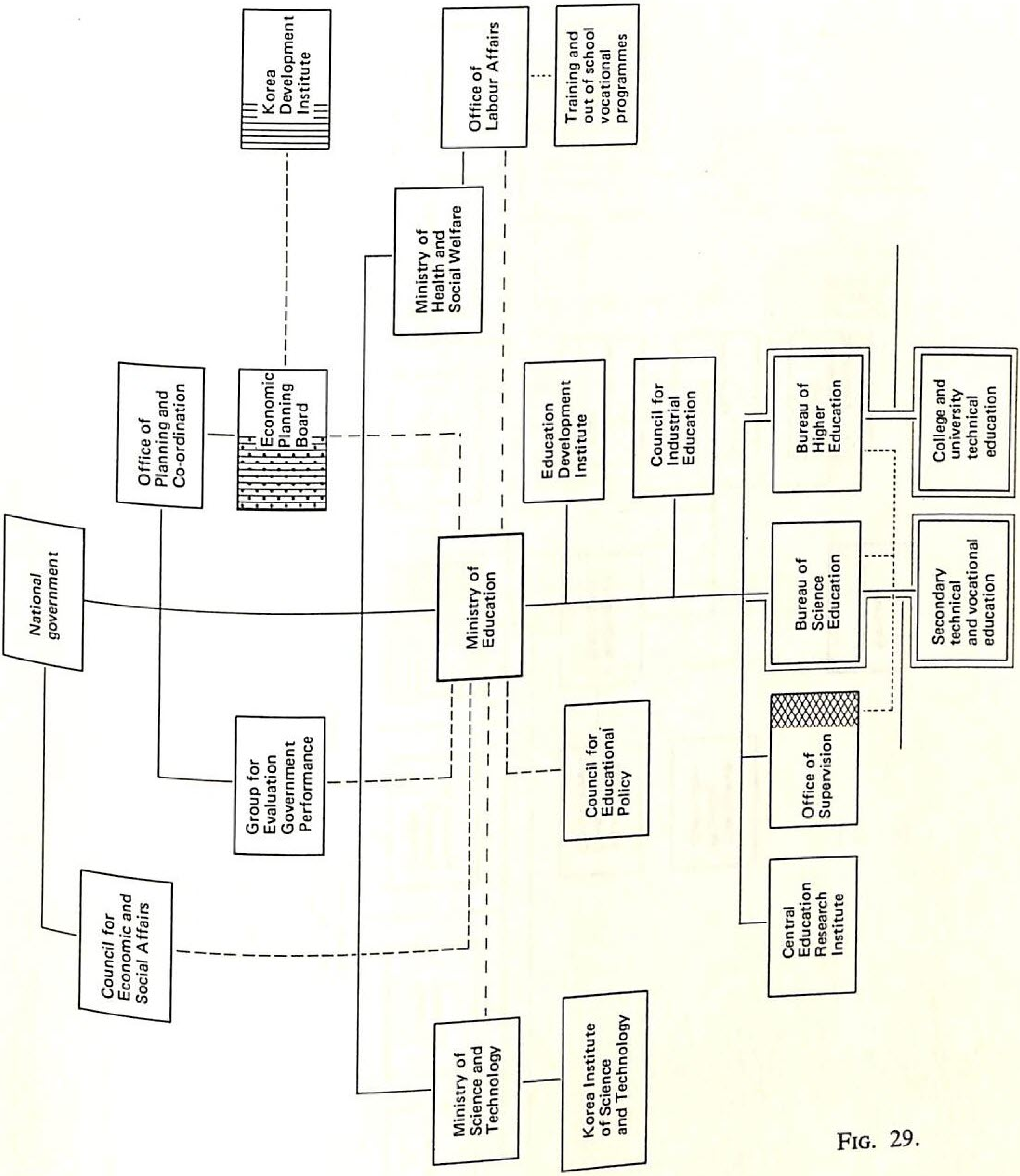
National government
Office of Planning and Co-ordination
Economic Planning Board
Korea Development Institute
Ministry of Health and Social Welfare
Office of Labour Affairs
Training and out of school vocational programmes
Education Development Institute
Council for Industrial Education
Ministry of Education
Bureau of Higher Education
College and university technical education
Bureau of Science Education
Secondary technical and vocational education
Office of Supervision
Central Education Research Institute
Group for Evaluation Government Performance
Council for Educational Policy
Council for Economic and Social Affairs
Ministry of Science and Technology
Korea Institute of Science and Technology

FIG. 29.

Malaysia

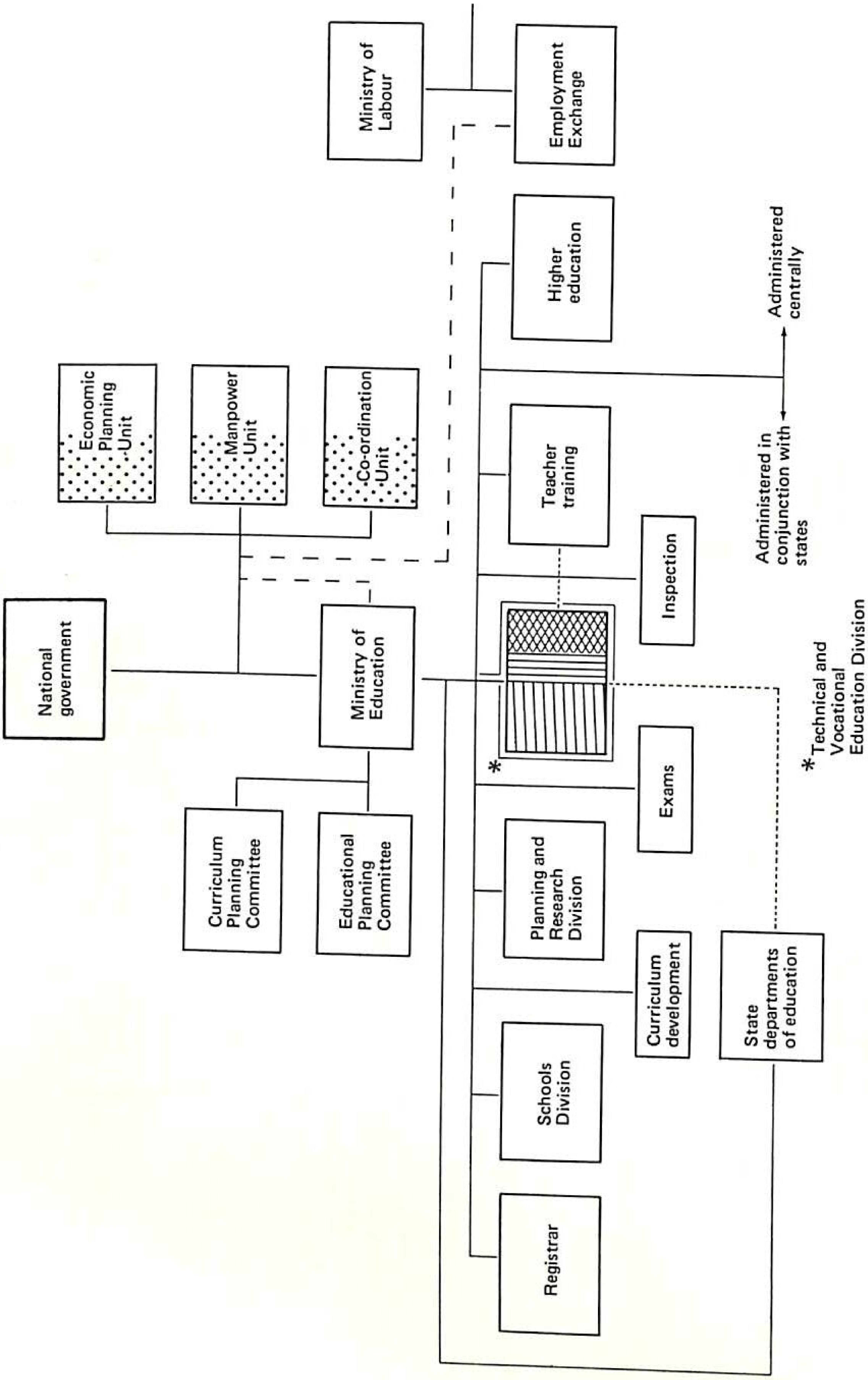

FIG. 30.

Nepal

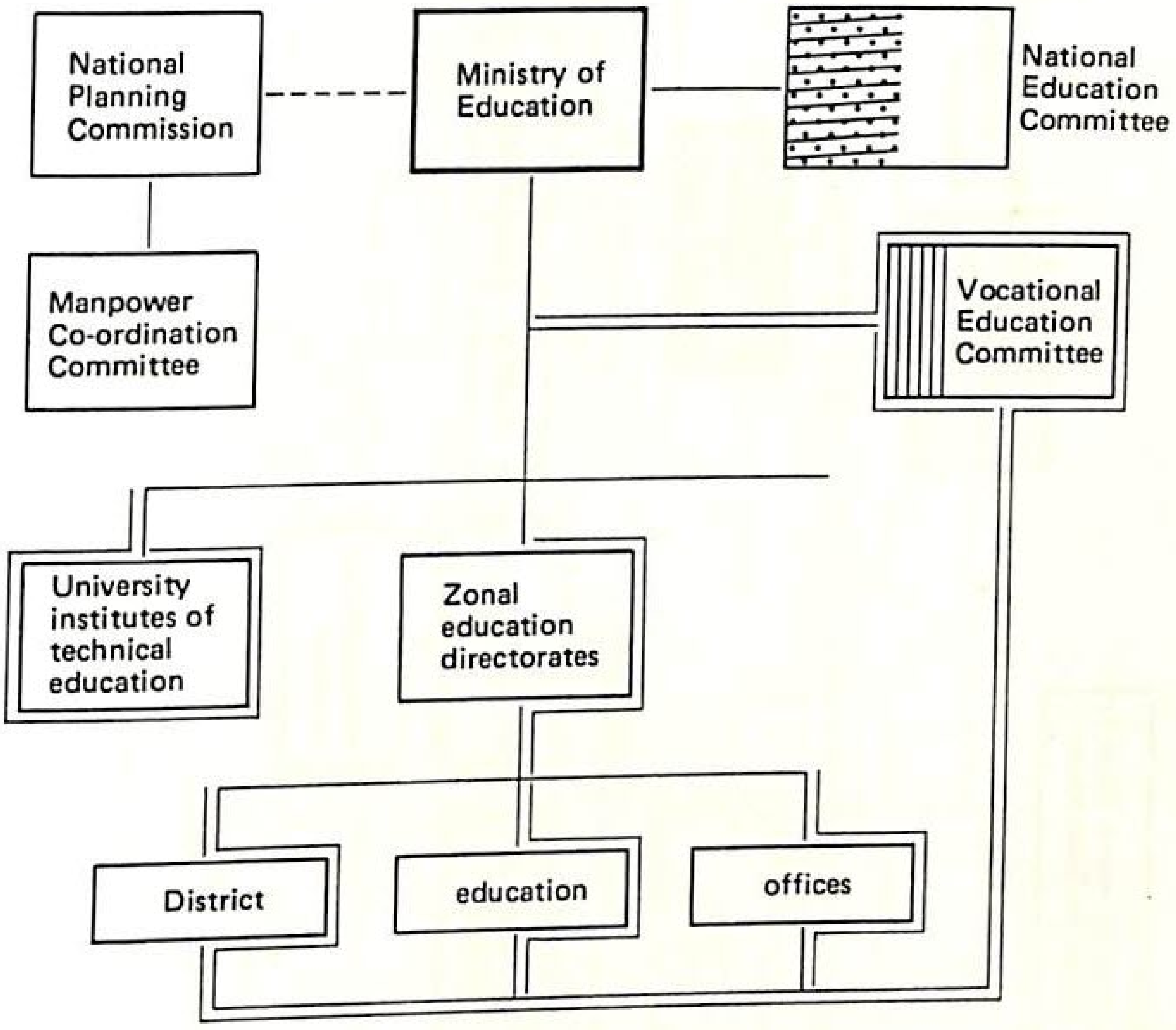
National Planning Commission
Ministry of Education
National Education Committee
Manpower Co-ordination Committee
Vocational Education Committee
University institutes of technical education
Zonal education directorates
District
education
offices

FIG. 31.

Nigeria

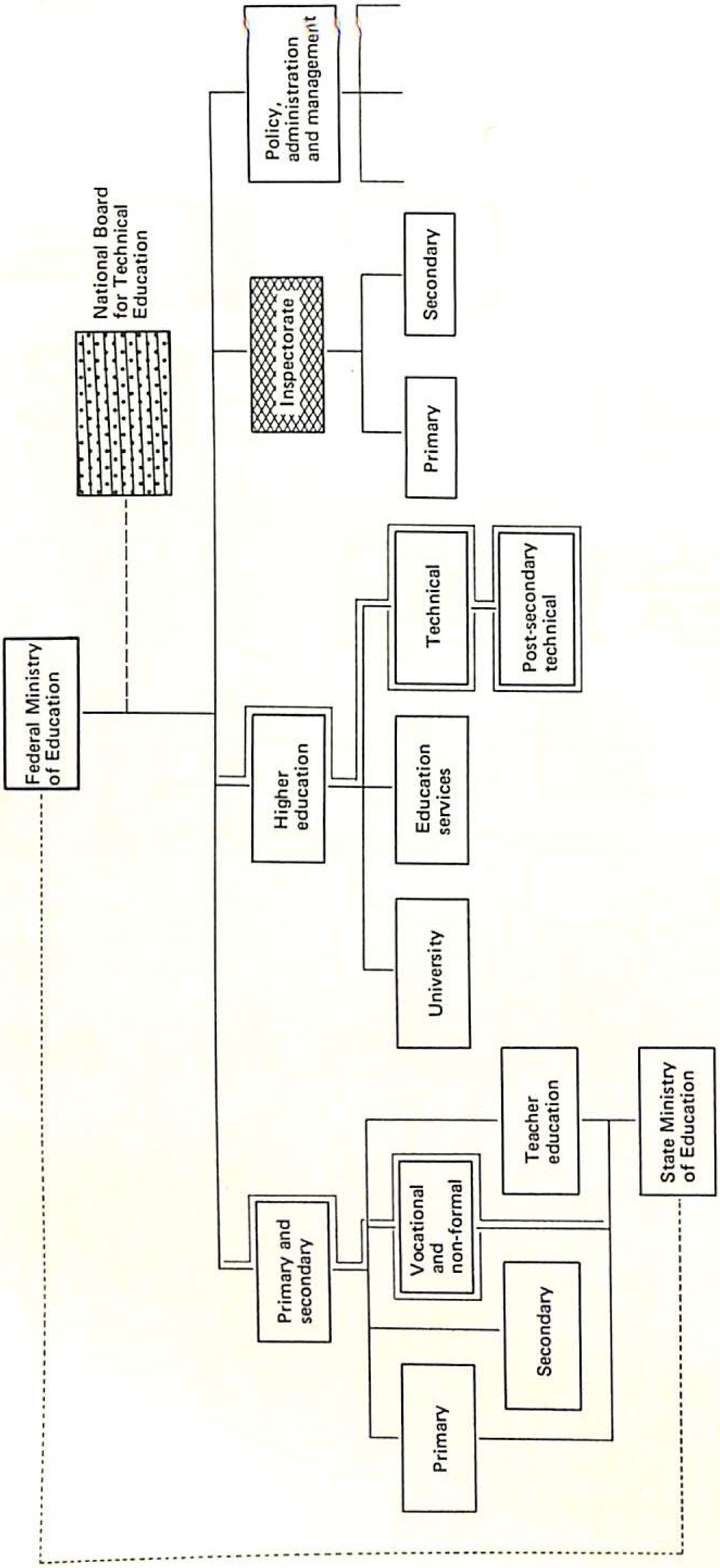

FIG. 32.

Sierra Leone

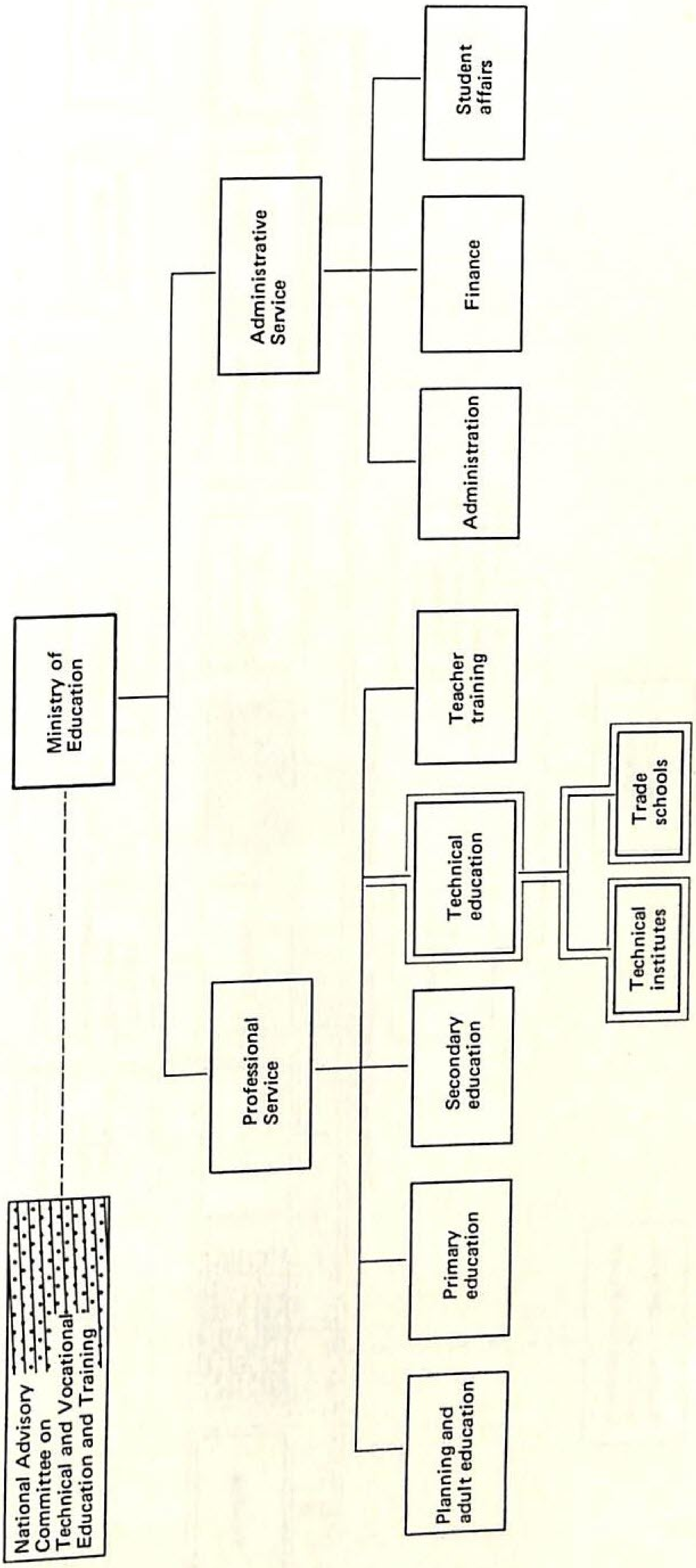

FIG. 33.

Thailand

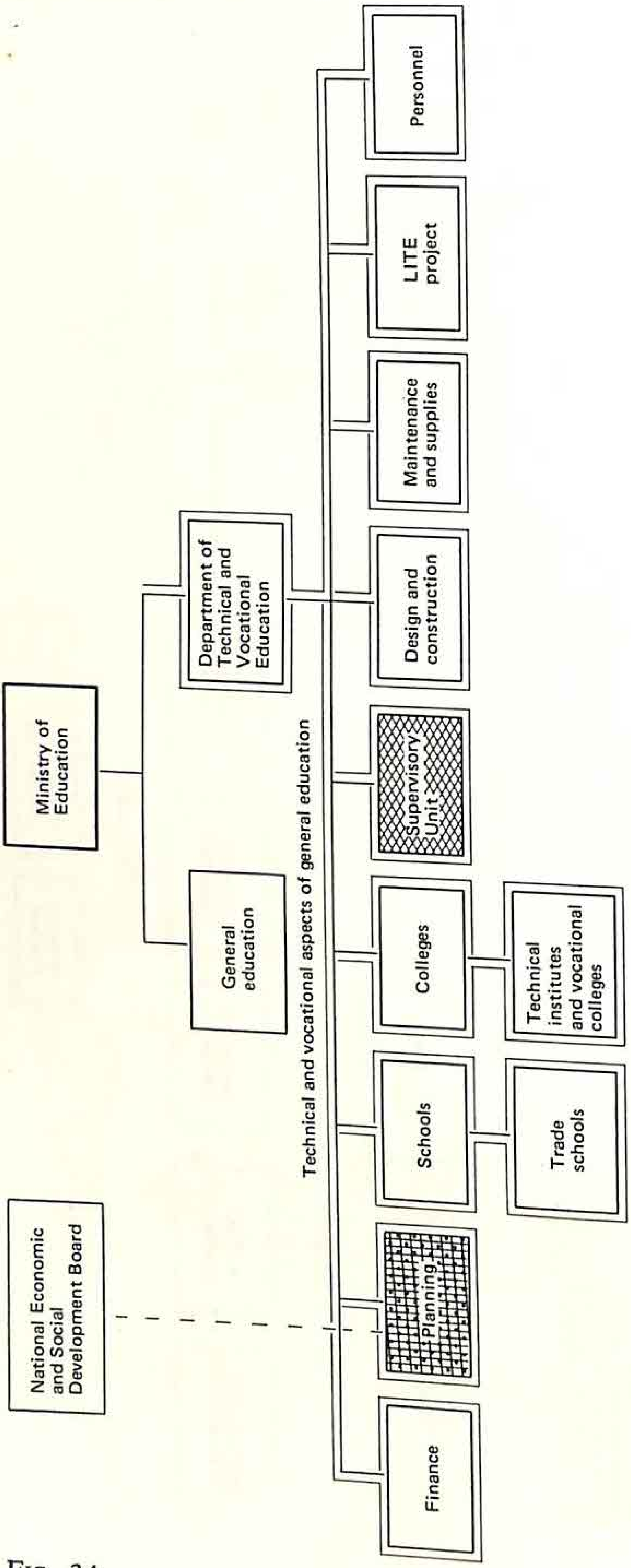
Ministry of Education
General education
Department of Technical and Vocational Education
Technical and vocational aspects of general education
National Economic and Social Development Board
Finance
Planning
Schools
Trade schools
Colleges
Technical institutes and vocational colleges
Supervisory Unit
Design and construction
Maintenance and supplies
LITE project
Personnel

FIG. 34.

Uganda

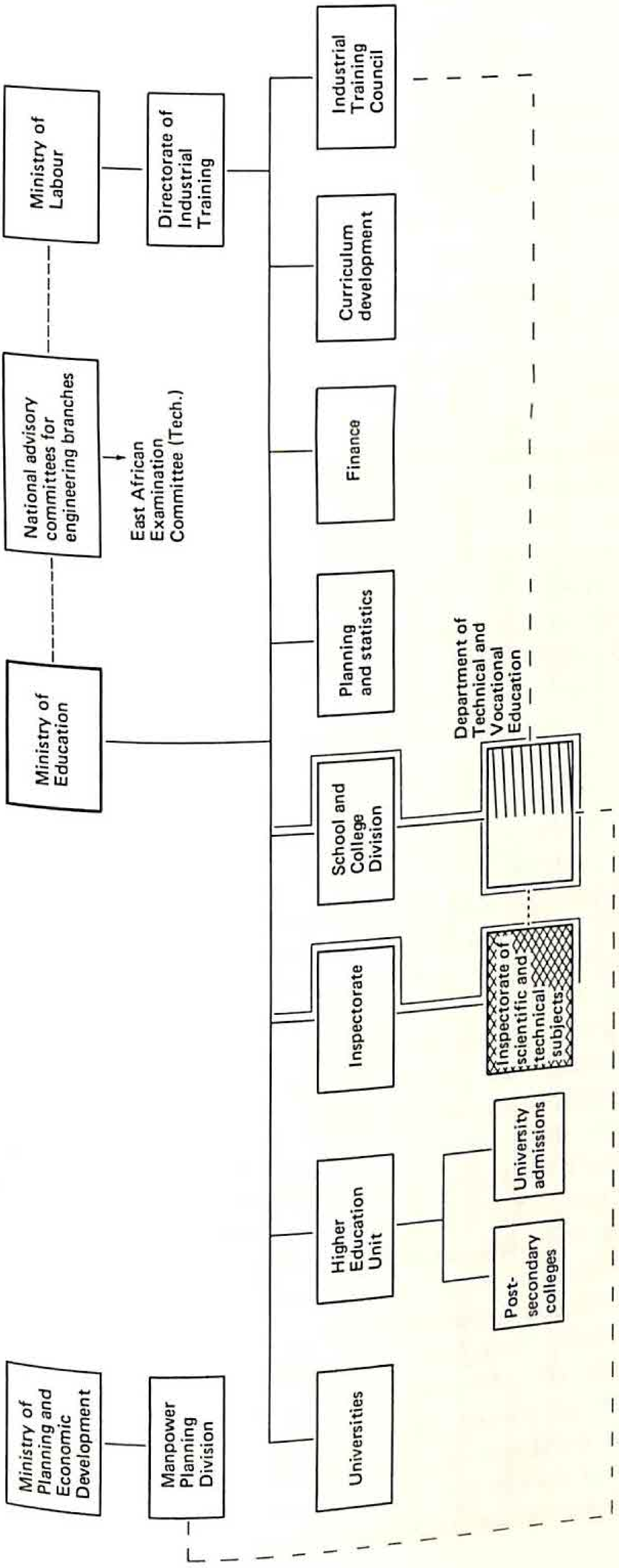
Ministry of Planning and Economic Development
Manpower Planning Division
Ministry of Education
National advisory committees for engineering branches
East African Examination Committee (Tech.)
Ministry of Labour
Directorate of Industrial Training
Universities
Higher Education Unit
Post-secondary colleges
University admissions
Inspectorate
Inspectorate of scientific and technical subjects
School and College Division
Department of Technical and Vocational Education
Planning and statistics
Finance
Curriculum development
Industrial Training Council

FIG. 35.

Uruguay

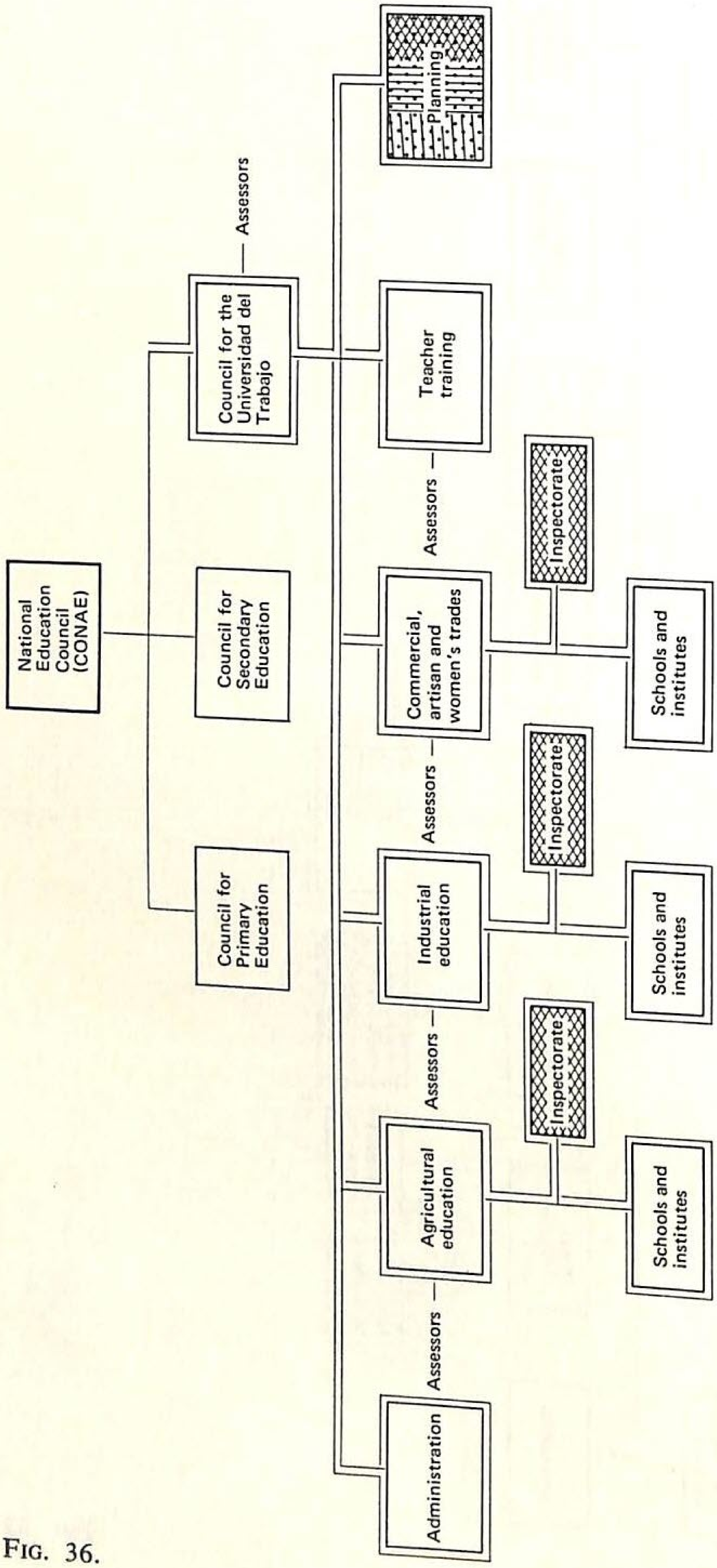

FIG. 36.

General administration and institutional management

The implementation of policy requires administrative structures which are a true expression of that policy. Indeed, the creation of new structures within the administration or modification of existing ones to correspond to adopted policy is the initial step towards bringing about change or reform. Thus several of the countries under study, having recently adopted policies to strengthen technical and vocational education within the educational system as a whole, have made structural innovations or are in the process of doing so in order to implement these policies. To cite several examples: the structure of the educational administration of Nigeria, shown in Figure 32, was set up in 1976. That of Sierra Leone, Figure 33, will be changed in the near future in the sense that the technical education division will be expanded considerably. This division, which now only administers the technical institutes and public trade schools, will in future have three major units: one responsible in general for in- and out-of-school technical and vocational education and training at secondary level; a second responsible for technician training, technical teacher training, and industrial supervisory and training staff; and a third responsible for planning, development and co-ordination of technical and vocational education and training. Liberia provides a good example of an approach taken in a country where provision for technical and vocational education is minimal but which has come to realize its significance in the whole development process and has adopted policies accordingly. Although the country has only two technical-vocational schools, administrative structures are being created which will eventually implement a broader policy of technical and vocational education. Because of the current reorganization of the Ministry of Education, it was not possible to diagram either the present or future structure of the ministry. The report, however, did indicate the direction to be taken for the administration of technical and vocational education. A Bureau of Science and Technical Education has existed within the ministry since 1972, but has never been fully staffed. Plans are now being made to expand and staff this bureau which will be organized into six units responsible respectively for: research, survey, evaluation and planning; curriculum and professional personnel development; agricultural education; business and office education; home economics education; and industrial arts. The Ivory Coast (Fig. 28) is exceptional in that responsibility for technical and vocational education as well as vocational training and continuing education up to the highest levels devolves upon the Ministry of Technical Education and Vocational Training separate from the ministry responsible for general education. The structures are now being put into place within the Ministry of Technical Education and Vocational Training which will allow this body to perform the functions for which it is responsible and include in addition to education and training, guidance, planning, technical teacher training, research, supervision and continuous evaluation of the system as a whole. Because of the close links with employment which are an organic part of its structures, and its responsibility for all forms of continuing education relating to professional advancement, this ministry will eventually serve as the primary link between education and employment as a whole.

Thirteen of the fourteen countries whose administrative structures are shown in Figures 23–36 have a special body or bodies attached to the national ministry of education responsible for technical and vocational education. In many cases, these bodies are responsible not only for general administration but for one or more of the other four functions. In some of the countries, the special body takes the form of a Department of Technical and Vocational Education attached directly to the ministry and separate from structures responsible for general and higher education: Afghanistan, Bangladesh, Burma, Malaysia, Sierra Leone, Thailand, Uruguay. In Ethiopia, the special body takes the form of a council and is indirectly attached to the Ministry of Education. In other cases the responsible agency or agencies are located under bodies generally responsible for primary, secondary and/or higher education: Nepal and Uganda. The Republic of Korea provides an example of a variation on the latter organizational method in that responsibility for the general administration of secondary technical and vocational education is incorporated into the body generally responsible for science education, while higher technical education comes under the Bureau of Higher Education. Although (because of its federal structure) Nigeria is a special case, it also follows this pattern in the organization of the Federal Ministry and in the administration of the federal educational institutions. The direct administration of most educational institutions is, however, the responsibility of the various state governments. India, also a federal State, is a case apart in that direct administrative responsibility devolves upon directorates of technical education with state departments of education while national policy is established by a body which has been created for this purpose within the Ministry of Education, Social Welfare and Culture and which has an advisory and co-ordinating function *vis-à-vis* the state departments of education. In two cases, Bangladesh and Thailand, where departments of technical and vocational education are directly attached to the ministry, responsibility for technical streams within comprehensive schools comes under the authority of the department responsible for general education.

Planning

The Revised Recommendation places great emphasis on the necessity for comprehensive and realistic planning for the development of technical and vocational education. The country reports provide ample evidence that this fundamental requirement is recognized and that planning structures are already in place or are being created which will allow this requirement to be fulfilled. Two general structural patterns for planning with regard to technical and vocational education may be distinguished. In the first pattern, primary responsibility for planning is assumed by a unit within the Ministry of Education; in the second, it is assumed by a national planning body.

Ten of the countries reporting provide for technical and vocational educational planning according to the first pattern. In Chile, the Inspectorate of Public Education (Superintendencia de Educación) is responsible for educational planning at national level while on regional level this task is carried out by the regional ministerial secretariats for education (*secretarias regionales ministeriales de educacion*). In both Costa Rica and Paraguay planning for technical and vocational education is provided for in the National Educational Development Plans. In Ethiopia, the National Council for Technical and Vocational Education attached to the Ministry of Education is responsible for both policy and planning. As mentioned above, Liberia proposes to institute a planning division within the Bureau of Technical and Science Education. The Technical and Vocational Education Division of the Malaysian Ministry of Education has full responsibility for planning. These plans are submitted for approval or revision to the Curriculum Planning Committee and the Educational Planning Committee attached to the Ministry. Nigeria has recently established a National Board for Technical Education within the Federal Ministry of Education to advise the government on policy and planning to meet manpower requirements. In Thailand, it is the responsibility of the Department of Technical and Vocational Education within the Ministry of Education to co-ordinate the development of technical and vocational education with manpower planning. Upper Volta places planning under the Directorate of Educational Planning attached to the cabinet of the Ministry of Education, a body separate from the Directorate of Technical and Vocational Education. The planning agency consults with other government organs such as the National Office for Employment Promotion under the Ministry of Labour and the Chamber of Commerce for Industry and Crafts under the Ministry of Commerce and Industry. Planning in Uruguay is the responsibility of a special planning division within the Council for the University of Work (Universidad del Trabajo). The Ivory Coast is again a case apart in that a semi-autonomous agency, attached to the Ministry of Technical Education and Vocational Training but having its own budget, is responsible for planning for technical and vocational education within the framework of the objectives of the national plan. This agency is also responsible, among other tasks, for framing general policy in liaison with the General Directorate of Training for possible adoption by the ministry, research concerning manpower requirements and the technical education and vocational training system, and evaluation of the functioning of the system.

Seven other countries place primary responsibility for overall planning within the national planning bodies which establish the criteria and the broad lines of development for technical and vocational education. In this pattern, more specific planning for technical and vocational education is undertaken by an appropriate body in the Ministry of Education. In Bangladesh, responsibility for planning devolves upon the Planning Commission attached to the Ministry of Planning. In this commission a special section exists which is responsible for relating technical and vocational education to manpower planning and employment. The Directorate of Technical Education initiates new programmes within the framework established by the commission. The programmes are then evaluated by the Ministry of Education and finally by the Planning Commission. After the evaluation process, the National Economic Council approves programmes for full implementation. In Burma, general planning for technical and vocational education is carried out through co-ordination between the Ministry of Planning and Finance and the Ministry of Education. The Technical, Agricultural and Vocational Council under the Department of Technical, Agricultural and Vocational Education is responsible for developing specific policy and plans along these lines. In India, general planning on national level is done through co-ordination between the All-India Council of Technical and Vocational Education of the Ministry of Education and the National Planning Commission. On the basis of these general policy guidelines, further planning is carried out at state level through the state boards of technical education attached to the states' departments of education which also co-ordinate with state-level manpower planning and employment agencies. The National Planning Council structures the overall development plans of Jordan. The Directorate of Technical and Vocational Education is then responsible for establishing policy and planning within these outlines. In the Republic of Korea, general planning is carried out by the Economic Planning Board attached to the Office of Planning and Co-ordination and the Ministry of Education is responsible for developing policy for technical and vocational education accordingly. The various government departments have, however, a fair amount of independence in the planning process with regard to their respective domains. In Nepal, overall planning for technical and vocational education is carried out through co-ordination between the Manpower Co-ordination Committee of the National Planning Commission and the Ministry of Education. In Panama, the Ministry of Planning and Economic Policy together with the Institute for Human Resources Training and Development is responsible for manpower planning and projections upon which technical and vocational education programmes are based.

Co-ordination

The co-ordination of in-school and out-of-school technical and vocational education and of technical and vocational education with manpower requirements and employment is closely linked to general provision for policy-making and planning. Paragraph 12 of the Revised Recommendation strongly urges that bodies at national level be created which, through their membership and function, co-ordinate all forms of technical and vocational education as well as education and employment. Four of the countries reporting have now created such structures. The National Council for Technical and Vocational Education in Ethiopia is responsible both for planning and co-ordination. The All-India Council of Technical and Vocational Education with representatives from the state governments, from national ministries, from industry labour and commerce, from professional bodies, the universities, technical institutions, parliament and other concerned bodies, is a permanent advisory body serving the co-ordinating function. Nigeria's recently established National Board for Technical Education will have similar responsibilities. The Ivory Coast has taken a different approach to the question of co-ordination in that this function is the central one ascribed to the Ministry of Technical Education and Vocational Training. Through its structures, this ministry organically links in- and out-of-school technical and vocational education and training, and all forms of continuing education and in turn links these to employment. Sierra Leone plans to create structures co-ordinating technical education and employment, and in the country report provided a diagram to illustrate the probable organization (Fig. 37).

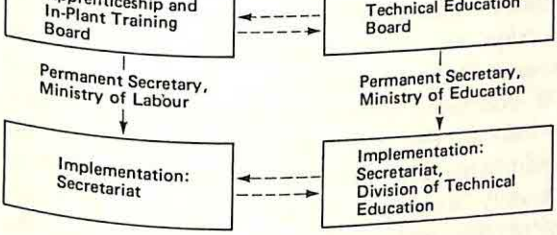
Ministry of Labour
Ministry of Education
National Committee on Employment and Training
Apprenticeship and In-Plant Training Board
Technical Education Board
Permanent Secretary, Ministry of Labour
Permanent Secretary, Ministry of Education
Implementation: Secretariat
Implementation: Secretariat, Division of Technical Education

FIG. 37. Proposed structures to co-ordinate technical education and employment in Sierra Leone.

Although Upper Volta has yet to create structures for co-ordination, the country report indicated the advisability of establishing a permanent advisory body for technical and vocational education which would be responsible for policy and planning, as well as for co-ordination and research. In all these cases, both existing and planned, the national body is primarily responsible for planning and policy-making, as well as for ensuring the necessary links between education and employment and manpower planning.

In the other countries, various types of provision have been made for co-ordination. The Technical Education Board in Bangladesh, responsible for policies regarding curricula, accreditation and examinations, by virtue of its membership, which includes both educators and employers, serves a co-ordinating function. In Jordan, three major agencies are now required to consult in order to co-ordinate technical and vocational education with manpower planning, training and employment: the Ministry of Education, the Ministry of Labour and the National Planning Council. In both Thailand and Uruguay, responsibility for co-ordinating technical and vocational education with employment lies with subdivisions of the major agency responsible for technical and vocational education under the Ministry of Education. In Thailand, such co-ordination is undertaken either by the schools or the colleges divisions of the Department of Vocational Education. In Uruguay, this is undertaken by the pivotal Planning Division of the University of Work (Universidad del Trabajo), which is also responsible for general policy, overall evaluation of technical and vocational education and research. The Bureau of Scientific and Technical Education in Liberia, when staffed, will undertake the co-ordinating function. In three countries (Kenya, the Republic of Korea and Malaysia) co-ordination with employment is undertaken independently by the various governmental agencies and departments responsible for technical and vocational education and training. Uganda has a system of national advisory committees for the various engineering branches which link together the ministries of education and labour, as well as the Industrial Training Council, on the one hand, and, on the other, link these to the East African Examination system.

Research

The reports of the twenty-three countries indicate that generally structures and institutions for a co-ordinated research effort for the development of technical and vocational education are either non-existent or very weak. In most of the countries, research is being carried out in one or several institutions, but few report a concerted policy on research upon which to base planning and policy-making. For the most part, research in the area of manpower planning, employment trends and economic development in general is carried out separately from educational research. The Ivory Coast provides an exception to this very general statement in that the National Office of Vocational Training undertakes research into questions of manpower requirements and employment, both on a national basis and in terms of sectorial needs, as well as educational research and experimental projects. Provision for pedagogical research for technical education and vocational training as well as for design and production of teaching equipment and materials is made within the framework of the National Pedagogical Institute for Technical Education and Vocational Training.

Supervision

Most countries reported the existence of supervisory services, but comprehensive services ensuring not only that educational standards are maintained within the schools but also overall evaluation of technical and vocational education have, on the whole, yet to be created. The Ivory Coast and Uruguay in their structures, which are similar in that they incorporate responsibility for technical and vocational education within the education system and vocational training outside it, have, however, both made such provision. In the Ivory Coast, the National Office of Vocational Training is responsible for the external evaluation of technical and vocational education and training in order to ensure that it meets the objectives set as well as for establishing the methods and criteria of evaluation. The General Directorate of Training is responsible for the internal evaluation of the system in order to assure that institutions and programmes, both public and private, are meeting adopted standards. Through this system of internal evaluation, private schools are accredited or not and uniform standards may be upheld throughout the system. The University of Work in Uruguay provides throughout the structures for the function of supervision and evaluation : the administrative division is responsible for supervising and evaluating the efficiency of the administration; each of the three divisions which correspond to occupational clusters (agricultural, industry, commerce and the artisan trades) contain structures for supervision and evaluation of programmes, teachers, facilities, and finally, the planning division has structural provision for the overall evaluation of the university.

Financing

In all of the countries under study, technical and vocational education is primarily financed from public funds, central or local. In some of the countries, financing is borne entirely by the State; in others, to varying degrees, the responsibility is shared by private agencies or individual students through school fees. Many receive or have received aid from external sources for capital investment through bilateral agreements or from international organizations. One country, Bolivia, requires that industry share the burden by contributing 2.5 per cent of profits to the government for education, of which 68 per cent is assigned to technical education.

Tables 1-3 indicate the general relationship between expenditure on technical and vocational education and expenditure on education as a whole.

The figures for those countries which specified the percentage of the education budget for recurrent expenditure devoted to technical and voca-

TABLE 1. Technical and vocational education: percentage of education budget for recurrent expenditure.

Country	Date	Latest figure (%)	Date	Projected estimate (%)
Afghanistan	1974	6.4	1975	6.7
Bangladesh		3.0		
Burma	1974/75	2.4	1975/76	2.7
Kenya	1974/75	3.0	1975/76	2.5
Malaysia		5.3		
Sierra Leone		2.2		

TABLE 2. Percentage of education budget for capital expenditure.

Country	Date	Latest figure (%)	Date	Projected estimate (%)
Afghanistan	1975	19.0		
Bangladesh		15.0		
Burma	1975/76	25.0		
Kenya	1974/75	10.0	1975/76	32.0
Nigeria			1975/80	11.0

TABLE 3. Percentage of total education budget with no distinction between capital and recurrent expenditure indicated.

Country	Percentage	Country	Percentage
Bolivia	3.76	Nepal	28.0[1]
Chile	5.28	Panama	6.0
Costa Rica	7.0	Thailand	15.0
Ethiopia	20.0	Uganda	10.0
India	20.0	Uruguay	11.6
Liberia	5.3		

1. Percentage of total budget for higher education.

tional education indicate that the latter, despite the higher costs involved, still claims a relatively modest proportion of the budget. On the other hand, the figures concerning capital expenditure indicate a trend to making the capital investments necessary for the development of technical and vocational education.

The guidelines for the country reports requested that an indication be given of unit costs per student per year for technical and vocational edu-

TABLE 4. *Unit costs in United States dollars.*[1]

<table>
<tr><th rowspan="2">Country</th><th colspan="4">Secondary technical and vocational</th><th rowspan="2">Second-ary vocatio-nal</th><th rowspan="2">Second-ary tech-nical</th><th colspan="4">Post-secondary technical</th><th colspan="2">Average unit cost</th><th colspan="2">Average unit cost[2] / GDP per capita</th></tr>
<tr><th>Indus-trial</th><th>Agricul-tural</th><th>Com-mercial</th><th>Other</th><th>Indus-trial</th><th>Agricul-tural</th><th>Com-mercial</th><th>Other</th><th>Second-ary</th><th>Post-se-condary</th><th>Second-ary</th><th>Post-se-condary</th></tr>
<tr><td>Afghanistan</td><td>262</td><td>218</td><td>79</td><td>129</td><td></td><td></td><td></td><td></td><td></td><td></td><td>172</td><td></td><td>1.95</td><td></td></tr>
<tr><td>Bangladesh</td><td></td><td></td><td></td><td></td><td>68</td><td>101</td><td></td><td></td><td></td><td></td><td>85</td><td></td><td>1.29</td><td></td></tr>
<tr><td>Bolivia</td><td>819</td><td></td><td>84</td><td></td><td></td><td></td><td>2,031</td><td></td><td>1,751</td><td></td><td>452</td><td>1,891</td><td>2.25</td><td>9.40</td></tr>
<tr><td>Burma</td><td>170</td><td>133</td><td>81</td><td></td><td></td><td></td><td>141</td><td></td><td>251</td><td></td><td>128</td><td>196</td><td>1.58</td><td>2.42</td></tr>
<tr><td>Chile[3]</td><td>162</td><td>399</td><td>130</td><td>155</td><td></td><td></td><td></td><td></td><td></td><td></td><td>212</td><td></td><td>0.29</td><td></td></tr>
<tr><td>Costa Rica</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="2">386</td><td colspan="2">0.48</td></tr>
<tr><td>Ethiopia</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td colspan="2">1,000</td><td colspan="2">11.00</td></tr>
<tr><td>Republic of Korea[3]</td><td colspan="4">467</td><td></td><td></td><td colspan="4">695</td><td>467</td><td>695</td><td>1.23</td><td>1.44</td></tr>
<tr><td>Liberia[3]</td><td colspan="4">802</td><td></td><td></td><td></td><td></td><td></td><td></td><td>802</td><td></td><td>2.4</td><td></td></tr>
<tr><td>Malaysia[3]</td><td></td><td></td><td></td><td></td><td>1,068</td><td>1,990</td><td colspan="4">3,020</td><td>1,529</td><td>3,020</td><td>2.54</td><td>5.01</td></tr>
<tr><td>Nepal</td><td>304</td><td>273</td><td></td><td>411</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>329</td><td></td><td>3.69</td></tr>
<tr><td>Nigeria</td><td></td><td></td><td></td><td></td><td>1,667</td><td></td><td colspan="4">3,333[4]</td><td>1,667</td><td>3,333</td><td>7.34</td><td>14.68</td></tr>
<tr><td>Panama</td><td colspan="4">329</td><td></td><td></td><td></td><td></td><td></td><td></td><td>329</td><td></td><td>0.31</td><td></td></tr>
<tr><td>Sierra Leone</td><td colspan="4">305</td><td></td><td></td><td></td><td></td><td></td><td></td><td>305</td><td></td><td>1.4</td><td></td></tr>
<tr><td>Thailand</td><td></td><td></td><td></td><td></td><td></td><td></td><td>539</td><td>343</td><td>294</td><td>245</td><td></td><td>355</td><td></td><td>1.35</td></tr>
<tr><td>Uganda</td><td></td><td></td><td></td><td></td><td>241</td><td>482</td><td colspan="4">1,446</td><td>362</td><td>1,446</td><td>2.56</td><td>10.25</td></tr>
</table>

1. Figures given in national currencies converted to dollars on the basis of mid-point rates for 1975 in Table 66, 'Exchange Rates', *U.N. Monthly Bulletin of Statistics*, Vol. XXX, No. 10, October 1976.
2. GDP per capita taken from *U.N. Yearbook of National Accounts Statistics, 1975*, Vol. III : *International Tables* (ST/ESA/STAT/SER. 0/5/Add. 2).
3. Figures given in dollars in the Report.
4. Figure includes costs for upper secondary technical and vocational education.

cation if this information was available. Table 4 has been drawn up on the basis of the information given in the reports, which was provided in most cases as only an approximate indication. As may be seen from the table, the figures provided were broken down in various ways.

The averages for secondary and post-secondary education are given separately wherever possible. In order to have a rough idea of comparative unit costs, these averages were then, with three exceptions, related to the per capita Gross Domestic Product (GDP) for 1973, the year when the latest complete figures were available for most countries. The latest figures for two countries were from 1970, and for a third from 1972. Table 4, because of the figures available, the various means by which they were arrived at, and ways in which they were presented, can give only the roughest picture of comparative unit costs. The ratios arrived at for secondary technical and vocational education yielded a spread of from 0.29 to 11. Leaving aside, however, the two countries with the highest ratios and the three with the lowest, the ratios for the remaining ten countries were concentrated in a range of 1.23 to 2.56, a differential of 1.33 points between the highest and the lowest. It might be very tentatively concluded from these figures that, on the whole, unit costs vary relatively little among the majority of the countries concerned in this study.

4 The three phases of technical and vocational education

The Revised Recommendation identifies three phases of technical and vocational education and contains chapters devoted to the goals, content and organization of each : technical and vocational aspects of general education, technical and vocational education as preparation for an occupational field, and technical and vocational education as continuing education. The three phases taken together constitute technical and vocational education as lifelong education.

Almost all of the countries reporting have taken, or are planning to take, measures to introduce technical and vocational aspects into the general education programme. On the whole, the integration of general technical studies into the required general education curriculum remains in an experimental stage, but steady progress is being made. The main thrust of the various countries' activities is found in the second phase of technical and vocational education : the education and training within the school system of the skilled and qualified manpower needed for development. The last phase receives the least attention for the moment as the facilities are not yet generally available within the educational system to provide continuing education, and the necessary lines of co-ordination between education and employment remain to be worked out. There is a general effort, however, to design programmes of technical and vocational education as preparation for an occupational field in such a way as to prepare graduates to proceed to higher level education or to enter the work force with the possibility of seeking and profiting from continuing education and training at a later date.

Technical and vocational aspects of general education

The programmes which are now available, or being planned, in the countries under study have been designed for the most part in a way that is compatible with the objectives found in the Revised Recommendation. These may be summed up as the provision of an introduction to technology and to the world of work within the general education curriculum so as to orient those with the interest and ability into programmes of technical and vocational education which prepare for employment in a specific occupational field, and to equip those leaving the school system at whatever point with attitudes and skills which render them better able to undertake training and to find work. Some countries emphasize one objective above the others. While, ideally, this phase of technical and vocational education should in no way be considered as preparation or training for employment in a particular field, circumstances in some countries have led to greater emphasis on basic skill training because the majority of children do not continue beyond the primary or lower secondary level.

Most of the countries agree that the introduction of technical and vocational aspects in the required general education curriculum at lower secondary level (and in some cases at upper primary) has the potential of becoming a powerful tool for democratizing education. In this way, technical studies and the occupations to which they lead (vital in terms of development) may become a positive option for young people, which was not the case in the past when the highest value was placed on traditional academic studies while technical studies were considered appropriate only for the less bright.

The following brief descriptions provide a résumé of the approaches adopted in the twenty-three countries with a view to including technical and vocational aspects in the general education curriculum.

Afghanistan

Afghanistan is planning to introduce practical studies into the curriculum of the seventh and eighth years of schooling.

Bangladesh

Introductory technical studies in the optional fields of industrial arts, agriculture and home economics have been introduced into the curriculum of the ninth and tenth grades in a few secondary schools. These programmes are available to about 2 per cent of the students enrolled in these grades. Where these studies have been introduced, they represent 25 per cent of the total curriculum and within the studies 33 per cent of the courses are devoted to theory and 66 per cent to practice.

Bolivia

Bolivia has introduced practical or manual activities in the primary curriculum and, in grades VI-VIII, a vocational orientation programme based on local or regional occupations.

Burma

Programmes have been introduced in the sixth to ninth years of schooling in 50 schools, and plans have been made to extend these programmes to 550 schools in the near future. These programmes represent 12 per cent of the total curriculum and are directed primarily to practical skill development.

Chile

Chile has so far not introduced technical and vocational aspects into the general secondary school curriculum, but has concentrated on expanding programmes of secondary technical and vocational education rather than academic education.

Costa Rica

Academic schools in Costa Rica represent 73 per cent of the total institutions for secondary education. In the seventh to ninth grades of the academic schools, industrial arts is offered, representing 8 per cent of the total curriculum. In the tenth to eleventh grades, 16 per cent of the curriculum is devoted to technological studies.

Ethiopia

Ethiopia has undertaken an overall reform of the education system, introducing productive technology in all primary and secondary schools with the aim of thoroughly integrating education and work. The plan of action for the primary curriculum calls for 40 per cent of the time to be devoted to activities at places of work, while in the secondary school curriculum this proportion is to be raised to 60 per cent. Members of the community are involved in the practical instruction of the students.

India

This country plans to introduce technical and vocational aspects in the general education curriculum.

Ivory Coast

The Ivory Coast has introduced a technology stream as a possible option for students in the upper secondary general schools. It is also planned to integrate general technical studies introducing pupils to technology and the world into the curriculum of the upper-primary and lower-secondary grades.

Jordan

Jordan has introduced technical and vocational aspects into the curricula of the academic streams of two new comprehensive secondary schools (one for boys, the other for girls). Three other comprehensive schools are now under construction. Programmes in industry, agriculture, commerce and home economics are offered in the seventh to twelfth years of schooling : in grades VII-IX, three to five hours per week are devoted to one of these areas, and in grades X-XII, five hours per week.

Kenya

Kenya is in the process of introducing technical and vocational aspects into the secondary school curriculum in the fields of industry and commerce. Beginning in 1974, these two fields may be offered as examination fields for the East African Certificate of Education.

Republic of Korea

Students in grades VII-XII of the general secondary schools are required to choose a one-year course in one of the following subjects : industrial technology, commerce, agriculture or home economics. They are in addition required in the course of their secondary education to take a two-year technical crafts course.

Liberia

An industrial arts programme is offered in grades IX-XII in one school. From the academic year beginning in 1977, the country plans to introduce an industrial arts programme in grades VI-IX in some general schools.

Malaysia

In Malaysia, about 25 per cent of pupils enrolled in grades VI-XI have available to them technical and vocational aspects in the fields of industrial arts, agriculture, home economics and commerce. The percentage of the total curriculum devoted to these varies with each field : industrial arts and home economics, 10 per cent; agriculture, 8 per cent; and commerce, 75 per cent.

Nepal

Nepal has introduced elements of general technical and vocational aspects into the curriculum of the sixth and seventh years of all secondary schools, and vocational subjects are allotted 20 per cent of school hours at upper secondary level in the general schools which represent 75 per cent of school enrolment.

Nigeria

One of the major educational objectives of the third National Development Plan is to reform general education by introducing technical and vocational aspects into the curriculum. Although this policy has yet to be implemented, it is planned to incorporate introductory technical subjects into the curriculum of the seventh to ninth years of schooling.

Panama

Panama is introducing a new curriculum for grades VII-IX which has a strong vocational component along with occupational guidance.

Paraguay

Students in grades IV-IX are introduced to practical activities and to the world of work.

Sierra Leone

Sierra Leone offers programmes in the eighth to twelfth years of schooling in design and technology, agriculture, and home economics. Business programmes are offered, beginning in the tenth or eleventh years of schooling. Ninety-five per cent of students enrolled in the secondary schools have access, if they so choose, to one of the first three programmes, and 45 per cent have access to the business programme.

Thailand

Work education adapted to the local environment is to be incorporated into the curriculum of primary education and lower secondary general education. Practical work will be done outside the schools either under the supervision of parents or at assigned places of work.

Uganda

Uganda plans to introduce practical subjects in grades VI and VII, and at least one technical and vocational subject must be offered in government-assisted secondary schools (grades VIII-XI). These subjects, which include technical drawing, metalwork, woodwork, agriculture, accounting, shorthand, typing, clothing, textiles and home economics, may be examined at 'O' level, that is, offered for an ordinary school leaving certificate. Technical drawing is now offered in one school up to 'A' level, or the examination for completion of higher secondary education and consequent entrance to higher education.

Upper Volta

Technical and vocational aspects have been introduced into the curriculum of one secondary school, but it is planned to extend this to all schools through a reform in which all lower secondary education will become a 'cycle of occupational education' (*cycle d'enseignement des métiers*), thus erasing the distinction between technical and general education.

Uruguay

According to a reform which was already being implemented in 1976, technical and vocational aspects will be introduced into the curriculum of the three years of lower secondary education. These subjects will make up 10 per cent of the total curriculum and will be organized by the Universidad del Trabajo, the division of the educational system responsible for all technical and vocational education, in co-ordination with the general education division.

Technical and vocational education as continuing education

The twenty-three countries concerned in this study are all engaged in strengthening programmes within the school system which lead to occupational qualification. There is also a concerted effort to insert these programmes into the educational system in such a way as to allow those following these programmes to continue in higher studies within the system. In the past, technical and vocational education at secondary level was almost universally terminal; with the development of post-secondary technical education and with the upgrading of secondary technical and vocational education programmes, there is at present a definite trend to create more educational opportunities for students following technical and vocational programmes. This trend is inseparable from the growing realization that skilled and qualified middle-level manpower is essential for economic and social development and, therefore, appropriate educational provision must be made.

Most of the countries have programmes of vocational or occupational training at various levels which come under the authority of ministries other than the Ministry of Education, of autonomous public agencies or of private agencies. The majority of such programmes come under the direction of the Ministry of Agriculture or the Ministry of Labour.

The guidelines for the country reports suggested that figures be given which would provide a picture of the target group for technical and vocational education as preparation for an occupational field. Several of the reports provided detailed figures of enrolments in various institutions, of enrolment trends, of enrolment in the various fields taught. Table 5 provides, in so far as the information allowed, a very general picture of the participation of the 15–22 age group in technical and vocational education.

Several tentative conclusions may be drawn from the information included in Table 5. Technical and vocational education serves a minority of young people enrolled in the education system : enrolment in technical and vocational education in eight of eighteen countries corresponds to 10 per cent or less of total enrolment of the 15–22 age group, and in eight other countries to 20 per cent or less. Eleven countries provided information with regard to female enrolment in technical and vocational education. Of these, seven countries reported that girls constitute 25 per cent or more of enrolment in technical and vocational education. Another country gave figures for commercial education only in which girls make up 50 per cent of the enrolment. From supporting information contained in the reports, it is clear that most girls following technical and vocational education programmes are concentrated either in commercial or in home economics programmes. Enrolment in part-time technical and vocational education programmes is on the whole very low, with the exception of Thailand where technical and vocational education is almost exclusively part-time. Industrial and commercial education are the predominant fields of study in those countries reporting figures, with the exception of Sierra Leone where enrolment is fairly evenly spread among industrial, agricultural and commercial fields. Very few countries were able to supply figures indicating unemployment rates for the 15–22 age group in general as compared to that among graduates of technical and vocational education programmes. Most of the countries concerned, as noted in Chapter 6 on problems and innovations, do not have the facilities for accurate record-keeping and

TABLE 5. Enrolment in technical and vocational education (TVE).

Country	Percentage of total 15-22-year-olds in TVE	TVE enrolment as percentage of total school enrolment	Percentage of girls and women in TVE	Part-time enrolment as percentage of total TVE enrolment	Enrolment by field (%)				Percentage of unemployed among 15-22 year-olds	Percentage of unemployed among TVE graduates
					Industrial	Agricultural	Commercial	Other		
Afghanistan		7-8								
Bangladesh	0.25	2	0.5	1.5	80	5	15		60	15
Burma		1.4								
Chile		5.9	42	0	43.6	1.9	38.5	16		
Costa Rica		18.5								
Ethiopia	2	25	26							
Ivory Coast										13.80
Jordan										
Boys		17			65	8	20			tending to 0[1]
Girls		12					65	35		
Kenya		2[2]								
Republic of Korea	11.5	50.2	33.3[3]	14[3]	30	9	35	25	44	39
			26.7[4]	9.4[4]						
			14.6[5]	5.8[5]						
Liberia		10	16						35	2
Malaysia	1.7	10.6	33.5	9	60.5	7	22	10.5		
Nepal		25[3]	15[3,6]							
		32.3[4]	2.6[4]							
Nigeria		7	50[7]							
Panama		15.8	48		21.2	4.3	70.5	4.1		
Sierra Leone	12	25	33.5	2	20	36.7	31.7	11.6		
Thailand	2.8	26		92.3						
Upper Volta		15	37							
Uruguay		19.1								

1. A certain percentage not employed in field of specialization.
2. Very approximate figure, arrived at taking enrolments in first and fourth years of general, vocational and technical secondary schools. Does not include enrolments in business and industrial programmes in secondary general schools.
3. Secondary.
4. Post-secondary.
5. University.
6. This figure includes those enrolled in primary teacher training programmes.
7. This figure refers only to commercial education.

follow-up of those leaving the education system. Statistics on this point would, however, be a precious element in the evaluation of the effectiveness of technical and vocational education in preparing young people for employment. In three of the four countries supplying figures for unemployment among technical and vocational education graduates, technical and vocational education appears to have a definite advantage over general education in preparing young people for the world of work.

The organization of technical and vocational education as preparation for an occupational field and the means by which occupational qualifications are obtained in the individual countries are briefly outlined in the following paragraphs. These descriptions should be considered in conjunction with the educational structures provided in Figures 1-22.

Afghanistan

In Afghanistan, craftsmen are prepared at present in specialized upper secondary schools, as are middle-level technicians. Both qualifications thus require twelve years of schooling. Students qualify as higher technicians after thirteen years of schooling, including a technician course and four months' practical experience in industry, beginning in the tenth year. There are facilities for post-secondary programmes in commercial and agricultural fields, in addition to four-year degree courses leading to qualification as a practical engineer.

Bangladesh

Craft certificates are obtained after ten years of schooling, the last two spent in vocational institutes. Commercial diplomas are awarded after two years of study in upper secondary commercial schools, or twelve years of schooling. Three years of study in a technical institute following ten years of basic education lead to a technician's diploma. Bangladesh reports that, although the technical education establishments attempt to consult with the various employment sectors, there is as yet little continuous and close co-ordination between education and employment.

Bolivia

In Bolivia, skilled workers are trained outside the regular education system in various public and private training institutions. Within the system there exists a four-year upper secondary programme, entrance to which requires eight years' basic schooling, which leads to qualification as a middle-level technician (*bachillerato technico*). Higher technicians are trained in a three-year post-secondary programme.

Burma

Provision is made within the technical and agricultural high schools to prepare skilled workers and middle-level technicians. Higher technicians are prepared in post-secondary technical institutions. Formal occupational qualifications are awarded according to performance on trade tests. Facilities for both levels of qualification exist on a part-time basis through evening classes. Government departments and industry accept students for on-the-job training under arrangements worked out with the educational institutions.

Chile

In Chile, qualifications at skilled-worker level and middle-technician level are obtained on completion of special programmes within secondary education. Facilities for post-secondary technical education exist. These are all full-time programmes, part-time programmes for special trade qualification being given in training centres outside the school system. Arrangements exist for practical training within industry following completion of the school programme. This practical period is required for qualification.

Costa Rica

In Costa Rica, young people prepare for skilled-worker-level employment in vocational schools at lower secondary level. These programmes are of three years' duration following six years of general schooling. Middle-level technicians are prepared in three-year programmes given in upper secondary technical schools, and higher technicians prepared in post-secondary programmes of two or three years' duration.

Ethiopia

Skilled middle-level manpower, at both craftsmen and technician level, is prepared in second-level technical schools, and higher technicians in post-secondary technical colleges. Part-time and extension programmes in industrial and commercial studies are available in the institutions in city centres. The individual institutions keep contacts with employers. Although no concrete data are available, at present, graduates of technical and vocational programmes are in great demand.

India

Craftsmen at various levels are trained in industrial training institutes.

Craftsman qualification may also be obtained in three-year programmes in technical high schools, entrance to which requires completion of eight years' basic education. Technicians' diplomas are awarded after three years' study in polytechnics or rural institutes, entrance to which requires completion of ten years' secondary schooling. Those in technical and vocational streams in upper secondary education (eleventh and twelfth years of schooling) may proceed to technical faculties in universities or, with appropriate experience in an industrial training institute, may enter the last year of the technician diploma course in the polytechnics.

Ivory Coast

In the Ivory Coast, programmes in the vocational technical schools which admit students beginning after the seventh year of schooling lead to various types and levels of skilled-worker and craftsman qualification. Some of these schools also offer lower-level technician programmes. First-level skilled workers are prepared in training centres where, after one year of introductory studies, trainees obtain professional qualification in a second year and are then placed in enterprises for a period of six months before final qualification. Technicians are prepared in the technical upper secondary schools. Those obtaining the baccalaureate may proceed to higher technical and engineering studies in order to qualify as higher technicians or engineers and technologists. Qualifications are awarded on the basis of performance in examinations. In recent years, national standards (upon which these examinations are based) adapted to the local situations have been adopted for some professional qualifications and others are under study.

Jordan

In 1974, the Jordanian Board of Education adopted five occupational standards as they relate to education:

1. Limited skill level, acquired by various types of on-the-job training with few or no educational requirements.
2. Skilled level, which is the standard produced in apprenticeship programmes and trade training centres, requiring nine years of compulsory schooling for entrance.
3. Craftsman level, the standard reached in secondary vocational school programmes of three years' duration requiring completed compulsory education for entrance.
4. Technician level, acquired in two-year post-secondary technical institutions and similar programmes, requiring completion of secondary education for entrance.
5. Professional or specialist level, acquired in university-degree programmes.

Programmes in the educational system are full-time. Beginning in 1977, however, facilities will be made available in a post-secondary technical industrial institute to acquire a technician's diploma on a part-time basis.

Kenya

Kenya has recently completely revised its secondary technical curriculum. The secondary technical course is of four years' duration following seven years of primary education. During the first two years, students follow a common course. Beginning in the third year they must choose between an engineering and a construction option, but real trade specialization does not occur until the fourth year. At the end of the course students have several options open : craft training in their special field for craftsman certification; technician diploma programmes, either ordinary (two years) or higher (four years) at post-secondary level; or, if they succeed in the East African School Certificate Examination, university entrance. Those not taking the ordinary technician diploma examination, but who have successfully completed the two-year course, are awarded a technician's certificate. A number of training schemes at various levels exist outside the education system and plans are being made for further co-ordination among these and the education system.

Republic of Korea

In the Republic of Korea, some trade schools exist at lower secondary level (seventh to ninth years of schooling). It is the technical-vocational high schools, however, with three-year upper secondary programmes (tenth to twelfth years of schooling) which offer programmes up to craftsman level. Technicians are prepared in two-year junior college programmes, entrance to which requires completion of secondary education, usually in a comprehensive high school. Graduates of these programmes may enter university engineering faculties. Usually students enter engineering faculties after success in the college entrance examination. Part-time evening courses, while existing in only two vocational high schools, are far more common at post-secondary and university levels. Various modes of work study programmes are being experimented with. Normally, prospective graduates of technical and vocational programmes spend two to three months in industry, in field apprenticeships, during the last part of their programmes. Occupational qualifications are awarded on the basis of perfomance in the National Technical Qualifications Test for the level and field of specialization, ranging from assistant craftsman to professional engineer.

Liberia

The four-year programmes in the area vocational schools (ninth to twelfth years of schooling) are designed to prepare students for immediate employment after graduation. In addition, a number of trade training programmes exist outside the school system under other ministries or private agencies. There are plans to co-ordinate these more closely with the activities coming under the responsibility of the Ministry of Education.

Malaysia

Upper secondary vocational schools offer two-year programmes after nine years of general schooling, which lead to the Malaysian Certificate of Vocational Education at craft level. This is in most cases a terminal programme. Students in the two-year technical streams, as well as students in the academic (humanities) or science streams, sit for the Malaysian School Leaving Certificate Examination. Those who do well may proceed to a pre-university course, others may continue their education up to diploma technician level in post-secondary polytechnical institutions. There are no part-time programmes within the educational system. Standards are maintained by the examinations conducted by the ministries of education and labour and by supervision. Employers and public agencies participate in technical and vocational education through membership of advisory boards, examination boards, curriculum panels and planning councils.

Nepal

Vocationally intensive programmes in the schools prepare skilled workers. Following ten years of schooling, certified or middle-level technicians are now prepared in two-year programmes, given in post-secondary technical institutes. Plans are under way to upgrade the engineering institute to diploma or higher technician level. Since the technical institutes have been incorporated into the university structure post-secondary technical education is attracting more able students. Other technical training programmes exist in centres outside the education system.

Nigeria

In Nigeria, skilled craftsmen are prepared in vocational schools in programmes of two to three years' duration after nine years of general education. Ordinary diploma-level technicians are prepared in two-year programmes in polytechnics and colleges of technology, entrance to which requires the secondary school certificate after eleven years of general schooling. Higher diploma level technicians are trained in the same institutions in four-year programmes. Entrance to this programme may be directly after eleven years of general schooling. Students may come into the last two years of the programme from two other directions : holders of the General Certificate of Education 'A' level (thirteen years of schooling) may be admitted, as may holders of the Ordinary Technician Diploma after one year's industrial experience. Most programmes are full time, although part-time enrolments are increasing in the towns.

Panama

Panama is in the process of reforming its education system and the organization of technical and vocational education. Programmes within the school system leading to skilled-worker qualification are of from two to three years' duration, depending on the field, after completion of eight years of general schooling (six years' primary and two years' lower secondary). Lower level technicians (*peritos*) are prepared in programmes lasting from two to three years after completion of lower secondary education (nine years of schooling). Middle-level technicians are prepared in upper secondary technical education. After three years of study they may obtain a diploma qualification (*bachillerato*). Panama is at present concentrating on expanding this element of its technical and vocational education which prepares the student either for employment or for higher studies.

Paraguay

In Paraguay, skilled workers are trained in vocational centres outside the education system. These centres take young people with from six to nine years of general education. At present, efforts in technical and vocational education are concentrated on developing and extending upper secondary programmes leading to a technical diploma (*bachillerato*), which either prepares middle-level technicians for immediate employment or gives access to higher education. Plans are also under way to develop post-secondary technician programmes in the technical institutes which now only offer up to middle-technician level.

Sierra Leone

Full or part-time craft courses sanctioned by the City and Guilds of London Institute examinations are available in trade centres to those having completed ten years of general schooling. There are two technician diploma levels : the ordinary level requiring two years of study after twelve years of schooling, and the Diploma in Engineering requiring three years' study after twelve years of schooling. There are also various government training schools, a few small training-within-industry programmes and apprenticeship programmes. So far, there is little co-ordination or collaboration between education and enterprises (including the government) which have their own training programmes.

Thailand

Most vocational schools and technical colleges offer full- and part-time programmes. Skilled workers are prepared in the secondary vocational-technical schools offering three-year programmes, entrance to which requires ten years of general schooling. Technicians are prepared in post-secondary technical colleges in three-year programmes (two years for graduates of the three-year secondary technical/vocational programmes). At technician level, qualifications are awarded by committees of the individual post-secondary institutions according to national standards.

Uganda

In Uganda, specialized technical and vocational education takes place at upper secondary level during the twelfth and thirteenth years of schooling. Lower secondary vocational schools exist which prepare semi-skilled manpower in three-year courses leading to a junior technical certificate and some graduates of these may enter craft training at upper secondary level. Normally, craft and advanced craft preparation takes place in technical institutes. The Technical College and the Commercial College offer both ordinary diploma-level courses (middle-level technician) and higher-level diploma courses (higher-level technician), the first being of two years' duration, the second comprising a further three years. Graduates of upper secondary general education may enter post-secondary higher diploma courses. The two post-secondary technical colleges offer both full-time and a variety of part-time courses. A number of the courses are sanctioned by the East African Examinations Council.

Upper Volta

In Upper Volta, skilled workers are prepared in four-year programmes requiring six years of primary education for entrance or in three-year courses outside the school system. Diploma-level technicians are prepared at upper secondary level in three-year programmes leading to one of two types of qualification as a middle-level technician after thirteen years of schooling. One award, the bacalaureate, leads to higher education, the second, a technician's diploma, leads directly to employment. Higher-level technicians are prepared in a post-secondary technical institution. Technical and vocational education within the school system is full-time and mostly concentrated in industrial and commercial fields, agricultural education being the responsibility of the Ministry of Agriculture. The employment rate among graduates of technical and vocational education is good, with the exception of the home economics programmes for girls.

Uruguay

In Uruguay, skilled-worker preparation usually takes place in centres which are outside the regular school system but which, nevertheless, are attached to the same administrative structure, the University of Work (Universidad del Trabajo). These centres offer courses of various lengths and at various levels for those leaving the schooling. Middle-level technicians are prepared in programmes of four years' duration, entrance to which require completion of nine years' general education. Higher technicians are prepared at post-secondary level in courses of from one to three years' duration, depending on the speciality. The Universidad del Trabajo also organizes vocational training courses for drop-outs from the school system.

Technical and vocational education as preparation for an occupational field

Facilities for technical and vocational education as continuing education exist in virtually all the countries, but generally on a rather limited scale. In some of the countries, this type of education is provided primarily by institutions within the formal education system; in others, in training centres outside the system. Several of the countries reported having both types of facilities. Two countries, India and Bangladesh, reported a third type of facility specifically for gaining an engineering qualification equal to a degree : examinations which are held by the national professional engineering bodies and which may be taken without having followed a regular course within the education system.

Continuing education within the formal education system is usually organized on a part-time basis, either through evening classes or some form of day release, in upper or post-secondary technical and vocational institutions. Burma, Chile, India, the Republic of Korea, Malaysia, Nepal, Nigeria, Sierra Leone, Thailand, Uganda and Uruguay reported having facilities for continuing education available within the education system. In 1977, Jordan plans to initiate a part-time programme in one of the technical institutes, and Liberia and Paraguay are planning to organize programmes of technical and vocational education for employed adults. Most of these programmes are at post-secondary level, and are of recent origin. The Universidad del Trabajo in Uruguay also organizes mobile courses which are set up in localities as needs arise since they do not justify the creation of a permanent institution. The Republic of Korea is planning to undertake a new initiative in this area by creating junior colleges and university centres atached to industrial centres. In these institutions, employed adults may achieve technical and academic qualifications on a par with those acquired in the regular post-secondary and university institutions.

Eleven countries reported having facilities for retraining and upgrading trade and technical qualifications in centres outside the education system. Such programmes are either organized in individual enterprises for their own training needs or in vocational training centres. Two countries, Kenya and Uganda, noted the work of the ministries of agriculture in organizing extension courses in rural areas.

The Ivory Coast is a case apart in that the country is in the process of developing a broad scheme of continuing education integrated into the system of technical education and vocational training which, it will be recalled, come under the authority of the same ministry. Indeed, technical and vocational education and training programmes, both in the schools and the training centres, are being designed with the expectation that later education and training for professional upgrading, updating and promotion will be an integral part of working life. As a mark of the importance attached to continuing education, a semi-autonomous agency has been created, the Institut National de Perfectionnement Professionnel (National Institute of Continuing Training), which is organically linked to the Ministry of Technical Education and Vocational Training (see Fig. 28). This institute, which is a sort of 'holding company' grouping several specialized centres, is directed by a board on which employers and unions are strongly represented. The administration of the institute is responsible for identifying the needs of enterprises and for co-ordinating the activities of the various specialized centres. Other institutions for further professional training exist which are sanctioned by the ministry. The various centres and specialized institutions cater for all levels of professional qualification from upgrading of skilled workers to higher management training.

Six countries, Ethiopia, the Republic of Korea, Nepal, Nigeria, Sierra Leone and Thailand, reported on incentives for continuing education. In all of these countries some forms of continuing technical and vocational education are recognized in terms of promotion and/or salary increases for employees having completed programmes. In Nepal, government employees may have paid leave if their programme of studies comes within the field of their professional work. Nigeria has recently created an Industrial Training Fund which awards reimbursement grants to employers who send their employees for training. Sierra Leone reports that in certain cases continuing education courses for some employees are mandatory.

5 The implementation of technical and vocational education

Policies, whether alone or combined with appropriate organizational structures and facilities, cannot of themselves assure that technical and vocational education is implemented in such a way as to reach goals. The achievement of goals for developing and expanding technical and vocational education will depend to a great degree on the quality of the three major elements of implementation : (a) the students recruited, depending in turn upon the quality of guidance; (b) the equipment methods and materials used in the teaching and learning process; (c) the teaching staff.

The twenty-three countries reporting indicated their deep concern with these elements of implementation which, because they are a function of the financial and human resources available, together represent, in most countries, the major problem areas in the development of technical and vocational education.

Guidance

Guidance services are on the whole little developed in most of the countries under study. Some of the countries reported that guidance is for the most part institutionally based. Others reported that comprehensive guidance services exist or that the structures were being created for co-ordinated guidance.

In those countries where guidance is institutionally based, two patterns emerged : guidance is either the responsibility of individual teachers or is organized by professional staff attached to individual institutions. Bangladesh, Bolivia, Burma, Ethiopia, Jordan and Nepal reported that guidance is primarily the responsibility of individual teachers. Costa Rica noted that guidance encouraging young people to follow upper secondary programmes of technical and vocational education is offered primarily through industrial arts courses at lower secondary level. Nigeria reported that although little organized guidance has been offered in the past, there are now greater efforts to place guidance and counselling officers in a number of the secondary schools, particularly the comprehensive schools. Where no guidance officers are available the teaching staff is used and often those teachers responsible for guidance have lighter teaching loads.

The Republic of Korea reported that comprehensive guidance services exist on an institutional basis. In the Republic of Korea, guidance is the responsibility of student guidance centres, counselling offices and student affairs sections of schools and colleges. Within these services, evaluation and follow-up activities are carried out to obtain data which will allow for adjustment of education to meet individual needs more realistically.

In Thailand, guidance, although in the early stages of development, is institutionally based. Most educational institutions have at least one part-time guidance officer. Many technical and vocational institutions emphasize placement services rather than educational or vocational guidance strictly speaking. Often job placement of a student is made in the enterprise in which he passes the period of practical training during the final year of study. The difficulties in follow-up of former students were noted as a result of negligible responses to questionnaires sent out by the individual educational establishments.

Several countries reported that guidance services on national level exist or are planned. In Chile, guidance and supervision for technical and vocational education is co-ordinated within the Ministry of Educaton. Guidance is provided in the schools by teachers in special hours set aside for this purpose. Every effort is made to co-ordinate the educational guidance given to students in technical and vocational institutions with that offered in lower secondary education and in academic schools, as well as to provide vocational counselling. In India, the Central Bureau of Education and Vocational Guidance gives technical advice and helps guidance movements in the field of secondary education on national level. Several states have set up guidance bureaux. Guidance literature, occupational information materials and psychological tests are being developed by extramural departments of universities and university guidance bureaux. Guidance is also provided by the employment, information and guidance bureaux of the National Employment Service, student advisory bureaux and training and placement departments of a number of universities and other educational institutions. In the Ivory Coast, responsibility for educational and vocational guidance is placed in a special department under the Directorate of General Training, the Directorate for Guidance, Selection, Information and Documentation. Although guidance, evaluation and follow-up activities are the responsibility of the schools in Malaysia, there are guidance associations on national level. In Panama, guidance is directed by the National Educational Guidance Service. In the technical and vocational schools, guidance includes providing continuously updated information on employment opportunities to students as well as information on the education and training required for qualification, and possibilities for later education and training. In Sierra Leone, efforts to develop guidance have been undertaken recently. Thirty-three per cent of secondary technical and vocational institutions now offer guidance, which is still for the most part given by experienced teachers rather than professional staff. The Ministry of Education has taken initial steps to create a national guidance service in the form of a unit headed by a qualified guidance counsellor who is now working out the organizational details. In 1974, Uganda established a career guidance section within the Ministry of Education. The officer in charge travels to talk to groups and meet with school guidance personnel. To date, there are thirty-five publications available on careers for which technical and vocational education is required. A national guidance service was organized in Upper Volta in 1970 which gathers and distributes information, and deals with questions of selection within the education system, as well as with psycho-pedagogical research. Vocational guidance at the moment remains the responsibility of committees within each individual educational institution. Uruguay has organized a national guidance service within the administratve framework of the Universidad del Trabajo.

Equipment, methods and materials

In dealing with questions of methods and materials used in the teaching and learning processes, the reports tended to concentrate on indications of the relative importance of practical work in technical and vocational education and methods of students assessment and evaulation. One country, the Ivory Coast, noted a determined effort to use new teaching methods designed to engage the learner as a participant in the learning process rather than an observer. In most of the reports, questions concerning the machinery and equipment for technical and vocational education were discussed under several headings, as lack of appropriate equipment is a common problem for all. This question may therefore be more appropriately dealt with in the next chapter which contains an analysis of common problems. Several countries, however, did mention in their discussion of the methods and materials used in technical and vocational education that efforts are being made to develop and produce locally appropriate materials and equipment.

In general, the reports indicated that evaluation of student performance is based on traditional testing methods or examinations. Progress to a higher level of education often requires successful performance in a nation-wide examination, as may be seen from the earlier discussion of methods of articulation within the structures of the educational system. Testing and examination are obviously an important element in the evaluation process. A growing awareness, however, of the value of continuous assessment and evaluation, not only of student performance but also of the quality of technical and vocational education as a whole, is evident from several of the reports. India particularly mentioned that a system in which continuous internal assessment and evaluation in tandem with the development of new curricula requiring such evaluation is now being developed. Panama noted that although evaluation schemes are still in their infancy, the country was engaged in an effort to develop a general evaluation system through surveys of students, parents, teachers and the organization of teaching workshops.

All of the country reports mentioned the importance attached to the practical component of technical and vocational education, despite the problems of inadequate equipment, lack of teachers, lack of facilities for organizing practical periods for students in enterprises. Four countries, Burma, India, Jordan and Thailand, noted that a period of practical training in industry was a required element in programmes of technical and vocational education.

Ethiopia, India, the Ivory Coast, Nepal, Nigeria and Upper Volta reported on their efforts to develop and produce suitable teaching materials locally, together with equipment for technical and vocational education. In India, this task is the responsibility of the curriculum development centres whose activities include revision and formulation of curricula of technician courses based on job analysis, the design and preparation of instructional materials, the design and manufacture of laboratory equipment and teaching aids from locally available material, and the familiarization of teachers with pre-prepared instructional materials. Under an Educational Technology Project, exploration of resources of educational technology and the development of multi-media packages are being undertaken. In the Ivory Coast, a special unit for the design and production of teaching materials has been created within the national technical teacher training institution. In Nepal, the schools are expected to identify and use local resources, including material and personnel, in the practical component of their programmes. Nigeria reported that the uses of educational technology in the teaching process is now an element of the technical teacher training curriculum and, further, that the Science Equipment Centre is responsible for the maintenance and repair of school science equipment, as well as for the production of suitable teaching material for science and technology programmes. In Upper Volta, teachers are encouraged to devise and make appropriate teaching materials.

Teaching staff

Few of the countries reporting can permit themselves the luxury of having hard and fast rules as regards the qualifications necessary to teach technical and vocational education. Indeed, the twenty-three reports indicated that the recruitment of qualified teachers and the development of facilities allowing them to acquire these qualifications is the single largest hindrance to the full implementation of technical and vocational education policy.

Virtually all of the countries are in the process of developing programmes to train technical and vocational teachers. All of these require a completed secondary education for entrance. In general, two types of programmes are being developed; programmes which offer an integrated course of theoretical studies and practical experience in the special technical field in addition to pedagogical studies, and programmes of pedagogical studies directed to those future teachers already possessing the necessary technical qualifications and work experience.

The following brief descripitions indicate the forms of technical teacher training already existing or being developed in the twenty-three countries reporting.

Afghanistan

The country is engaged in an effort to upgrade the quality of the teaching staff as a whole through the development of both pre-service and in-service programmes and to prepare for the reform of secondary education which will require considerably increased numbers of technical and vocational teachers. The new teacher training programme will be of four years' duration requiring twelve years of schooling for entrance. It is expected that the new vocational comprehensive schools will supply candidates for the teacher training programmes.

Bangladesh

Teaching staff is recruited by the Public Service Commission which also recruits for other government organizations. Teachers of vocational technical subjects in vocational schools are required to hold a diploma or certificate in a technical or vocational field and preferably to have had appropriate work experience. Until now there have been no professional teacher training facilities for these teachers, but a teacher training institute is being established for the purpose. The teachers of technical subjects at the technical institutes must either hold a degree in engineering (in which case there is no provision for pedagogical training) or must hold a diploma in engineering technology (acquired after completing the programme at technical institutes) and must follow a one-year course at the Technical Teachers' Training College leading to a diploma in technical education. In both cases, some practical experience is preferable.

Bolivia

Almost all teachers of technical and vocational subjects are trained in two- to three-year courses in the Technical Teachers' Training College (Escuela Normal Superior Técnica).

Burma

The qualifications of teachers vary according to the type of institution for which they are recruited. Teachers in post-secondary technical institutions are required to have passed the programme of such an institution, to have five years' industrial or relevant work experience, and to have passed a short in-service teacher training course. Teachers in technical high schools must either hold a technical high school diploma, have five years' working experience, and a short period of in-service teacher training, or, alternatively, must have passed a technical test, have three years' practical experience and have undergone a one-year teacher training course. For teaching in the vocational schools, prospective teachers must have passed a trade test, worked as skilled workers, and have successfully completed a short in-service teacher training course. Teachers in the vocational schools may also be hired with five years' practical experience, the educational qualifications demanded being left to the discretion of the hiring institution.

Chile

For full appointment, teachers are required to hold academic qualifications as teachers, engineers or technicians. Temporary appointment may be made of persons (a) having completed university studies in the field to be taught but not holding a degree; (b) having achieved university qualifications in related fields; (c) holding professional qualifications recognized by the Ministry of Education in the teaching field; or (d) having graduated in technical and vocational education programmes. If the need arises, staff may be hired on a temporary basis at the discretion of the director of a particular educational establishment.

Costa Rica

Teachers are recruited and appointed by the General Civil Service Direction on the basis of performance in competitive examinations. When appropriately qualified candidates are unavailable, the Ministry of Education may make temporary appointments. Teachers are prepared at the Technological Institute of Costa Rica, the National University, and facilities will soon be available in the Research Centre for Technical Education Teachers.

Ethiopia

Teachers for technical and vocational education are recruited from five sources: graduates of two-year programmes provided by the technical teacher education department in the faculty of education at the university, graduates of two-year post-secondary programmes in the polytechnic institutes, graduates of the commercial schools and the technical schools, and finally, graduates returning from study abroad.

India

Qualifications for technical and vocational education teachers are prescribed by the All-India Council of Technical and Vocational Education. A postgraduate degree in engineering is required for teaching in the university-level engineering colleges. A first degree or a diploma in engineering is required for teaching in the post-secondary polytechnics. Recruitment is carried out through selection committees and departmental promotions. Four regional technical teacher training institutes have been created to offer formal teacher training for teachers in the polytechnics. Instructors in the industrial training institutes and in the apprenticeship training establishments are prepared in central training institutes. A central staff training and research institute has been created to promote research in technical and vocational education and for staff development purposes.

Ivory Coast

The Ivory Coast is in the process of creating a national technical teacher training institution, the Institut Pedagogique National de l'Enseignement Technique et Professionnel (IPNETP). This institution is designed to fulfil three functions : to assure the pedagogical preparation of intending teachers and to provide facilities for staff development; to assure the practical training and provide on-the-job experience for future teachers in technical education and vocational training programmes; to design, produce and distribute teaching aids and materials. Three separate services have been created to perform each of the functions. The practical training unit will have close ties to industry and is designed to eventually become an industrial production unit. The audio-visual production unit is also conceived as a pedagogical research centre. Teachers and training staff of all levels will be trained at IPNETP, recruited from among holders of the various technical diplomas possessing work experience and from among graduates of the National Institute of Higher Technical Education.

Jordan

The minimum qualifications for teaching technical and vocational education in industrial fields at secondary level (trade training centres, apprenticeship schemes, secondary industrial schools and vocational education in general education) are technician level achievement as a graduate of a post-secondary technical institution with some work experience. A university degree with some work experience is the minimum requirement for teaching in post-secondary institutions, and secondary agricultural and commercial schools. It is sometimes difficult to adhere to these minimum requirements, particularly in industrial fields. The Ministry of Education undertakes training of newly appointed staff during the summer holidays.

Kenya

In the years since 1969, Kenya has instituted programmes in three institutions to train three types of teacher for technical and vocational education. Teachers of industrial education in the general secondary schools are trained in a three-year programme at the Kenya Science Teachers College and are prepared to teach both science and industrial subjects. Business education teachers are prepared in either two-year diploma courses or three-year degree courses at Kenyatta University. Technical teachers are prepared in programmes in the Kenya Polytechnic. Two types of courses, both leading to a diploma in techncial teaching, have been developed to cater to the training needs of two categories of recruits: the 'long' course of four years' duration includes academic and technical studies, industrial skill training and work experience, and pedagogical studies, and is directed to future teachers recruited after completion of eleven years of schooling. This programme leads both to technical and pedagogical qualifications. A short one-year programme of pedagogical studies is offered to qualified technicians recruited from industry. A further programme leading to a higher teaching diploma is being developed for recruits from among practising secondary technical teachers and from industry. Some of the graduates of this programme will be teaching in the polytechnics in the future. Kenya has now embarked on a project to bring together all these teacher training programmes into one institution, the Kenya Technical Teachers College, now under construction. College staff is in training and some staff members are seconded to the programmes in the three above-mentioned institutions.

Republic of Korea

A doctoral or master's level degree is required for teaching in four-year university level institutions. A bachelor's level degree is required for secondary school teaching. Junior vocational colleges offer their graduates an auxiliary teaching certificate in secondary school technical crafts subjects. The staff of the junior colleges or post-secondary institutions have qualifications ranging from the bachelor's degree to the doctorate.

Liberia

At present there are no well-defined criteria for the recruitment, training and employment of vocational teachers, in great part because of the lack of technical teacher training facilities within higher education. Most vocational teachers are recruited from industry with little or no pedagogical training. It is expected that in the future the National Council on Technical and Vocational Education will determine criteria.

Malaysia

Future teachers are recruited after eleven years of schooling and trained in a two-year programme. Trade, agriculture-education and home-science teachers are trained in separate institutions designed specifically for preparing teachers in each of these fields. In-service courses are provided for technical teachers and they are sent to work for periods in industry in order to update their technical knowledge.

Nepal

Teachers of vocational subjects at secondary level are recruited from among diploma-holders in vocational fields trained in two-year programmes in the Institute of Education and the Institute of Agriculture. Teachers are also recruited from among persons trained abroad. Lecturers in the post-secondary institutes are mostly government employees, the majority of whom have trained abroad, who have remained after the transfer of responsibility for the post-secondary technical institutes from the government to the university. New lecturers at post-secondary level are recruited by the University Service Commission.

Nigeria

Technical teachers are trained at the National Technical Teachers College. Students are recruited from among secondary school certificate-holders and are prepared in an integrated programme of technical studies, practical experience and pedagogical studies. Those not holding the school certificate but with vocational qualification may be considered for the teacher training programme, but they are required to complete a year of preliminary study before entry to the programme. Existing technical and vocational teaching staff are sent to industry for updating their technical knowledge and experience during the long vacations.

Panama

Panama reported that there are as yet no formal teacher training provisions for technical and vocational teachers.

Paraguay

Technical teacher training will in the future be organized in the Higher Institute of Education (Instituto Superior de Educación) but at present there are few provisions for such preparation. Some teachers have been specially trained with international assistance.

Sierra Leone

Teachers of technical and vocational subjects are prepared in two types of programmes, one a diploma programme of three years' duration in the teacher training college, the second, a three- or four-year degree course in business or engineering followed by a year's post-graduate pedagogical study. The first programme leads to a Higher Teacher's Certificate, the qualification required for teaching in the first three years of secondary education. The second leads to a B.Sc. in engineering or economics or business studies, plus either a diploma in education or a post-graduate certificate in education, qualifying the person to teach at upper secondary level. Entrance to the teachers' college requires completion of twelve years of schooling and a certain standard of performance in the 'O'-level examinations. The degree programme requires completion of the university preparation course in the twelfth or thireenth years of schooling, plus a certain standard of performance in the 'A'-level examinations. Qualified technicians who hold professional teaching qualifications are also recruited for the secondary schools. Instructors in the trade courses are recruited from among those qualified as junior technicians in two-year training courses following successful completion of craft or advanced craft courses, with a professional teaching qualification (certificate of training as an instructor or the technical teacher's certfication) in addition to two years' industrial experience. The post-secondary technical institute is staffed by teachers having three or four years' training in a polytechnic or technical college and a year's technical teacher training or by engineering degree-holders, also having a diploma in education or its equivalent. Staff for the technical institutes (business studies) must have equivalent qualifications.

Thailand

Technical and vocational education teachers must hold at least a post-secondary diploma in their teaching field and perform successfully in placement tests.

Uganda

Teachers for the technical schools and institutes are recruited from industry and trained in a one-year course in the Department of Technical Education, Uganda Technical College. Candidates for the course must hold either an advanced craft certificate or an ordinary technician diploma. Teachers at post-secondary or university level are recruited by the institution concerned and prepared under staff development programmes.

Upper Volta

Teachers of technical and vocational education at the lower secondary level are required to hold a technical teaching certificate (*certificat d'aptitude à l'enseignement technique 1er degré*) and at the upper secondary level to hold a higher technical teaching certificate (*certificat d'aptitude à l'enseignement technique 2^{e} degré*). Both these qualifications are obtained through specialized programmes offered at the technical teacher training college (Ecole Normale d'Enseignement Technique) and, for entrance to the programmes, one of several possible secondary technical diplomas are required. The teacher training programmes are of two years' duration, the first year devoted to technical studies, the second to theoretical and practical pedagogical studies.

Uruguay

In the past, technical and vocational teachers have been recruited from employed professionals or from those with some university background. Now, however, two centres for training instructors for the Universidad del Trabajo are being created under its aegis, one for technical teachers, the other for agricultural education teachers.

6 Development problems and trends in innovation

The reports clearly indicate that many of the problems inherent in the development of technical and vocational education exist in common, despite the great variations among the individual countries. Furthermore, although the solutions now being worked out are geared particularly to the prevailing situation in each, certain common trends in innovation may be distinguished.

The problems fall into two major categories : those of a general nature involving impediments at national level to educational and economic development as a whole; and those which arise as more specific hindrances within technical and vocational education itself. As emphasized in earlier chapters, all the countries concerned have taken policy measures within recent years to alleviate both the general problems of adapting education to development and the more specific ones of expanding and improving technical and vocational education as a necessary condition for this adaptation and for the democratization of education. These measures, however, have had as yet little discernible effect. Significant inequalities remain between general education and technical and vocational education in terms of status, funds respectively devoted to these areas, and the proportion of the population served. Significant inequalities also remain in terms of the opportunities available in rural ones. Traditional systems of education, reinforced by traditional attitudes towards the role and function of education, considerably hinder the process of reform. The examination and selection process within the educational system, the ends to which it is thought education should properly lead, the consequent over-emphasis on academic areas of study are but several of the factors involved in the latter problem. The continued maldjustment between education and employment, which plagues many countries, both developed and developing, is a third continuing theme which is most closely interrelated with the state of technical and vocational education. It is a question not only of traditional education systems which turn out graduates unprepared for the realities of the working world, it is also a question of the maladjustment of current technical and vocational education to real development needs. The structures are not yet in place to allow for the necessary close co-ordination of educational, development and manpower planning. Nor are the structures in place through which educational authorities and institutions and employing agencies may co-ordinate planning and movement between education and training, on the one hand, and education and employment, on the other. There is also little provision for the research which is the necessary prelude to the creation of such structures and the implementation of policy, as well as essential for ensuring continuous development.

With regard to specific problems within technical and vocational education, there are several which appear to be common to a number of countries. The lack of financial resources, which forms the major barrier to expansion of facilities, often heads the list of problems in this category. The fact that general technical and vocational subjects are not always an integral part of the general education curriculum and that guidance services are inadequate affects both the number and quality of students recruited at all levels into technical and vocational education programmes to prepare for an occupational field. Problems concerning the recruitment and training of teachers remain a major hindrance to the expansion and improvement of technical and vocational education. Inadequate teaching materials and equipment, as well as lack of facilities to provide working experience during the course of study form a further set of frequently mentioned problems. In many cases, the curricula used in technical and vocational education programmes are outdated or not properly adapted to indigenous educational needs. The problem of inadequate curricula is often linked to the lack of research facilities and information and documentation services for technical and vocational education, as well as to lack of comprehensive evaluation procedures for quality control.

In a sense, nearly all the country reports are a record of innovation, both broad and narrow. In virtually all the countries, technical and vocational education was very little developed until the late 1960s. Thus, the situation as described in the reports is of very recent origin, and on the whole may be described as one in process of transformation. In general, broad innovation has entailed steps towards integrating technical and vocational education more fully into the total system of education along the lines suggested in the Revised Recommendation. Narrower innovations designed to solve specific problems arising in the development of technical and vocational education revolve for the most part around measures to expand and improve teacher training facilities, to increase and expand facilities for technical and vocational education, to develop local production of materials and equipment and to improve the practical training offered in technical and vocational programmes while at the same time strengthening ties with industry.

General problems and trends

Traditional educational systems combined with attitudes on the part of educators and the public which relegate technical and vocational education and the occupations for which it prepares to a low status form perhaps the greatest barrier to the development of technical and vocational education as an integral part of a system of lifelong education relating education and life. Many countries have found that although reforms have been introduced within the education system to render it more flexible, parents and their children prefer courses of study of an academic nature which may lead to the higher status professions. Since only relatively few are qualified or have the means to pursue the higher studies required for these professions, those young people completing secondary education and not going on to higher education often find themselves at a dead end, with high expectations and in competition for a few jobs in overcrowded fields. Where post-secondary technical education is little developed, the same situation often exists with respect to university graduates. In this situation, technical and vocational education, which prepares the qualified manpower necessary for development, becomes a second-class education for the less able students rather than a positive alternative for the majority of young people. As a result, technical and vocational education up to the present has catered to the needs of only a minority of young people enrolled in the education system, as the figures in Table 5 indicate. Educational authorities are thus faced with the necessity of developing strategies for channelling young people, in greater numbers and having greater ability, into technical and vocational education, without which educational reforms will remain a dead letter. This entire problem is compounded in some countries by the fact that their educational systems were grafted on from the exterior and so are doubly out of phase with the real needs of the country.

Probably the single most important trend in innovation which arises from a comparison of the experiences of the twenty-three countries as presented in the reports is the emphasis now placed on the integration of introductory technical and vocational studies in general secondary education, and in some instances beginning at primary level. This measure is designed to change traditional educational systems and the attitudes supporting their continuation to the detriment of development and thus has implications far beyond simple curriculum revision. It is, in fact, for the long term, a major step towards fully integrating technical and vocational education and general education and relating education more closely to the concerns of life as a whole. It is the central chapter in the overall educational reforms now being undertaken, as may be seen from the discussion of the technical and vocational aspects of general education in Chapter 4. The quasi-totality of the countries reporting have taken measures recently or are planning to do so in the near future to institute introductory technical and vocational studies in some form in the curriculum of lower secondary education, often as a required element. In several countries such studies may be continued at the student's option at upper secondary level. In some of the countries, the emphasis is on becoming acquainted with productive work, not as preparation for a particular occupation but as a means of developing positive attitudes towards the choice of occupation and towards the world of work.

These studies have also been introduced with a guidance function in mind : where guidance services are little developed as is the case in most of these countries, it is hoped that the introductory technical studies will dim the attraction of traditional curricula at upper secondary level and that more students will undertake technical and vocational studies at this and higher levels.

The insertion of technical and vocational aspects into general education programmes is closely linked to two other trends which may be distinguished. In some of the countries there are plans under way to gradually vocationalize upper secondary education. Not only will technical and vocational schools at upper secondary level be extended but, most important given the existing situation, students in secondary general education institutions will be encouraged, and in some cases required, to take practical courses with the emphasis on technical fields, through which they acquire skills rendering them more employable on completion of secondary education. The development of comprehensive secondary institutions is the major means of bringing about this change. The second trend is the effort being made to develop post-secondary technical education to prepare urgently needed higher technicians. This form of higher education serves to break down traditional educational categories by offering an alternative to university studies for those graduating from secondary general programmes who have had the opportunity to acquire some technical background at school. Post-secondary technical education also offers opportunities (which did not previously exist) for higher education to those completing secondary technical and vocational education. In the countries concerned in this study, these alternative routes through the educational system which create greater flexibility, though only in the planning or experimental stage, are designed in the long run to modify the role and function of education so that it makes a better contribution to the development of particular societies and to the well-being of those living in them.

The problem of the maladjustment between education and employment is closely linked to that of rigidity of structure in, and of attitudes concerning, the educational system. Similary, innovations designed to change attitudes have implications for the reform of structures. The traditional educational systems, which in many developing countres cater only to a very small minority, are no longer able to serve even these few in terms of preparing them for the occupations needed for the development of their countries. No longer relevant to this minority, education unreformed will certainly not have the capacty to prepare the future majority of young for the occupational realities they will face as adults.

An number of factors contribute to this major problem. The primary factor is formed by the set of attitudes which considers that education at the end of secondary level and beyond should necessarily lead to an office job with high professional status. The content of education is then determined by the ends to which it is felt it should lead : a university education in the traditional sense and a white-collar job. The employment markets of the countries under study cannot absorb what the educational system is actually producing. Disappointed expectations, and often migration of potentially valuable manpower, result. Thus, strategies must be developed to change attitudes concerning the appropriate goals of education but perhaps, as a prior condition, to change attitudes towards what kind of work is of the most value to both society and the individual.

A second factor contributing to the problem of maladjustment between education and employment cited by many of the countries is formed by the lack of facilities for projecting future manpower requirements, particularly in the areas of future economic development. Where institutions responsible for manpower planning and monitoring the employment situation exist, these are rarely in close contact with those responsible for educational planning. Looking more specifically at technical and vocational education, several countries reported that programmes were not adequately preparing young people for employment in their occupational fields or were not preparing them in the fields of real employment opportunity. These countries are then faced with the need to develop strategies for adjusting education as a whole, and technical and vocational education in particular, not only to the realities of the current or short-term labour market but also projected economic development.

Although every country cited negative attitudes to technical and vocational education and to the occupations to which it leads as a major brake on development in this area, all were aware that this was a problem which will only be solved in the long term by creating new sets of values through education, in the broadest sense, of the population as a whole. These countries have great hopes that in the long term the educational reforms designed to erase distinctions between general and technical and vocational education, and therefore to contribute to changing the relative value placed on the desirability of various occupations, will do a great deal to alleviate this problem. In this respect, projects undertaken in Ethiopia and Sierra Leone may be cited which represent an attempt to involve major sectors of the community in educational reform. Ethiopia has begun a National Campaign for Development through Co-operation. Data is being collected by secondary and university students and teachers throughout the country to help identify priority areas for innovation and experiment. Sierra Leone is undertaking an educational review with wide terms of reference throughout the country, involving public servants, social workers, trade unions and parents, to determine long-term learning needs and ways of meeting these through formal, informal and non-formal education, to survey the existing system, to outline a national educational strategy and to estimate the financial and organizational implications of any recommendations for development. Certainly close involvement of the community in devising answers to development problems is an effective way to ensure that reforms are accepted and that appropriate goals are agreed to — in short, that attitudes are changed.

As a whole, the educational reforms and innovations described in this study are undoubtedly designed to do away with the maladjustment between education and employment in the interests of development, and the expansion of technical and vocational education has a crucial role to play in solving this problem.

With regard to linking educational planning to employment and possible developments in the labour market, however, a number of problems remain. The situation projected and existing has been described in Chapter 3. In this respect, the approach taken in the Ivory Coast should be noted : the central thrust of the structural reform of technical and vocational education within the context of overall educational reform is towards linking as closely as possible manpower planning and employment to formal technical and vocational education and to training outside the system. This applies not only to initial occupational preparation but also to continuing education for those employed in all sectors and at all levels of occupational qualifications. In most cases, however, this co-ordination is in the very early stages. The first steps towards innovation are usually made in the direction of creating governmental structures to take on this responsibility. Often, however, the responsible bodies are unable to carry out their task because of the lack of facilities and procedures for gathering the necessary quantitative and qualitative information concerning actual and probable developments in terms of manpower requirements and of evaluating the effectiveness of education in meeting these.

Particular problems and trends

It was further evident from the reports that not only is education as a whole out of phase with the requirements of economic development and of the labour market, but that technical and vocational education as now designed frequently marches to a different, often outdated, and occasionally irrelevant tune. Certainly this is not the type of technical and vocational education the countries wish to expand and to insert into overall educational reform. Among the factors cited in connection with this problem was a lack of means for co-ordination between technical and vocational education and enterprises either for practical training, curriculum development, or eventual placement of graduates in employment. In this situation, graduates are not receiving adequate preparation for taking up their occupations. Programmes are also often designed on far too theoretical a basis and in some cases deal with technologies which are not adapted to the social and economic needs and hence to the real employment situation prevailing in the country. Furthermore, six countries (Bangladesh, Chile, India, Paraguay, Sierra Leone and Thailand) cited as a factor in the problem of inadaptation of technical and vocational education to real needs the fact that technical and vocational education programmes do not provide graduates with the attitudes or motivation which would allow them to become self-employed if they so choose, and eventually to contribute to the further creation of jobs. India has attacked this problem by establishing entrepreneurship training programmes for the technically qualified which would enable them to initiate productive activities with financial backing from the banks and the government.

Limited financial resources form an obvious and major block to the reform of education as a whole and particularly to the expansion of technical and vocational education within this reform. A number of the countries concerned are not yet able to provide free compulsory basic education, the fundamental educational priority. If proposed reforms involving the expansion of technical and vocational education and its incorporation throughout the education systems are to be achieved, the allocation of the remaining available resources must be made according to the priorities established by the adoption of these reforms. Further, these resources must be used as efficiently as possible. It is evident that such reallocation cannot be carried out overnight, particularly when, as at present, funds devoted to technical and vocational education in many countries represent a very modest, and in some cases wholly negligible, proportion of the education budget (see Tables 1–3). Such reallocation would also represent a major decision as to educational priorities. Many of the countries are obtaining external assistance for capital investment for technical and vocational education plant and equipment but, overall, the prospect is rather bleak as regards obtaining the funds for recurrent expenses necessary for the expansion of technical and vocational education. The prospect is likely to remain bleak unless major decisions are taken with a view to preparing the qualified manpower necessary for economic development, that is, unless existing resources are eventually distributed differently so as to increase future resources.

Taking a realistic view, the countries are at present most concerned with discovering means of using available resources more efficiently. Some of the innovations undertaken in more rational design and use of facilities and equipment, and local production of equipment and teaching materials are described below. Two countries, Burma and Kenya, have initiated schemes involving the community as a whole in increasing the funds available for technical and vocational education. In Burma, schools have been established which are partially financed by local communities and parent-teacher associations. This has particularly benefited rural areas where as a consequence more schools have been opened. In Kenya, the Harambee or self-help movement has been extended to technical education and three institutes of technology have been created by local communities. These are financed by voluntary funds collected from the public and are supported by voluntary organizations. Four more institutes are expected to open in the next year or two.

At every level within technical and vocational education itself, two major problems are common to virtually all the countries under study: inadequate teaching staff and lack of appropriate facilities for the practical training component of teacher preparation programmes. With regard to the recruitment of teaching staff, the major problem is to attract technically and pedagogically qualified people. In most of the countries, the technically qualified are few in number to begin with and are much sought after by business and industry where salaries are such that the education system can rarely compete for the services of these people. Not only is there a problem of number but also a problem of quality. Teachers who are technically qualified often have no pedagogical training. On the other hand, when teachers are recruited from those trained in university engineering or science programmes, these often have no real work experience and thus tend to emphasize theory to the detriment of practice. Some countries have in the past, when technical and vocational education programmes were very few in number, relied heavily on foreign personnel — a highly unsatisfactory solution because of the discontinuity in policy which results from the inevitably rapid turnover of such personnel and, above all, because such personnel, however dedicated and qualified, cannot ensure autonomous development.

A number of the countries are attempting to solve recruitment problems by developing integrated post-secondary technical teacher training programmes which take students directly after completion of secondary technical studies. These programmes include technical and pedagogical studies and attempts are made to provide for some practical work experience. Such programmes are usually organized in technical teacher training institutions or in post-secondary technical institutions which offer a final year of teacher preparation after technician qualification is achieved. Some of the countries, as may be seen in the summaries of teacher training provision in Chapter 5, are creating technical teacher training institutions which offer several types of programmes to prepare different categories of technical and vocational teachers. These programmes vary in length and content according to the qualifications students have at entrance — for example, secondary technical or vocational education, secondary general education with some technical subjects, technical qualifications and work experience, etc. Often these institutions also provide in-service courses for updating and upgrading practising teachers. The development and expansion of such institutions or centres offering a variety of courses seems to be a very promising approach to problems of technical teacher recruitment and training, and is a major distinguishable trend among the countries reporting.

The second frequently cited problem in implementing adequate technical and vocational education programmes is that of providing the proper facilities for practical training. The problem is dual: technical and vocational institutions are ill-equipped and, further, provision for actual work experience in enterprises is lacking. Equipment for the industrial fields of technical and vocational education is very expensive, both in terms of initial investment and in terms of maintenance. Many countries also have to import this equipment, which is doubly costly and difficult to maintain because of difficulties in obtaining spare parts. Furthermore, imported equipment is often not really adapted to the learning requirements of the students.

Some countries have taken steps towards developing local school equipment industries for technical and vocational education. Burma plans to establish a production centre and a technical upper secondary school to produce simple machines and equipment for the technical high schools and the vocational schools. Bangladesh has created an educational equipment bureau to design, test and manufacture equipment for vocational institutions in collaboration with local industry. In Chile, one school is being equipped to produce educational equipment. Ethiopia has created an educational materials production centre for the local production of equipment. This type of solution has numerous advantages. First, equipment may be produced more cheaply and is better adapted to local needs. Secondly, the production of equipment provides students and teacher with worthwhile practical experience of the total production process. Such approaches towards producing equipment locally are worth much further exploration and development and could be introduced into either technical institutions or teacher training institutions. A second approach reported by some countries consists of making every effort to ensure that existing equipment is used to its maximum potential. Bangladesh reports such an effort : the workshops of most technical institutions work in two shifts, students in technical fields using them in the morning, those in vocational fields in the afternoons. Bolivia reports that technical school workshops are also used for training programmes under the direction of the Ministry of Labour and for programmes organized by the Bolivian Apprenticeship Institute. This again is a useful approach to the possibilities which should be further explored — for example, through the creation of multi-purpose centralized workshops serving a number of institutions or mobile workshops. In this way valuable equipment would not remain idle.

Several countries reported innovative action designed to provide practical work experience for students in technical and vocational education programmes. Burma reported that all institutions under the Department of Technical and Vocational Education accept job orders from the government and the public, thereby rendering school workshops productive. Ethiopia is in the process of creating production units in which students may acquire the necessary experience. The Republic of Korea is engaged in the expansion of the co-operative work-education system at the college level, and Nigeria, as noted earlier, has created an industrial training fund to finance practical training experience. The central problem of continuous close co-ordination between education and enterprises in terms of planning, curriculum development, co-operative arrangements for training and placement remains for the most part unsolved.

The development and evaluation of curricula in technical and vocational education requires the organization, staff, information and expertise which some countries cite as lacking. Three countries noted recent innovative action in this area on national level. In Burma, the Department of Technical and Vocational Education is currently undertaking a general evaluation of the curricula offered in technical and agricultural institutions. In Bangladesh, a subcommittee of the National Curriculum Committee has been created to deal with problems of curriculum development in technical and vocational education. Ethiopia, in line with its policy of involving the community closely in educational reform, noted local initiatives in curriculum development for the work education now being introduced in all schools. It is evident from the reports as a whole that curriculum development and evaluation now require much more attention if the proposed wide-ranging educational reforms are to be carried out and technical and vocational education brought into line with the real needs and aspirations of each individual country.

Curriculum development and evaluation cannot be isolated from identification of needs, research into how these may be met, experimentation with solutions and evaluation of these experiments. This domain of educational activity requires a network of strong research and information services linking the national and local levels which many of the countries noted as lacking. In virtually all the countries, the basic structures exist through which such services might be created or expanded : bodies within the national educational administrative structure responsible for technical and vocational education, or responsible for overall curriculum development institutions of higher education. The examples of two countries, Kenya and Nigeria, may be cited in this respect. In Kenya, the Bureau of Educational Research at the University of Nairobi is undertaking an industrial research project to evaluate technical and industrial education in the secondary schools and ways to improve articulation within the school system. Two institutions have been created in Nigeria responsible for overall educational research : the National Education Research Council and the Comparative Educational Study and Adaptation Centre. For most countries, however, the problem remains to co-ordinate the various research and information activities undertaken for education in general and technical and vocational education in particular.

The present chapter has only outlined the major problems and trends in innovation indicated by the reports as a whole and does not reflect the wealth of detail provided in many of them. Although the problems are very extensive indeed, and many of them can only be solved or partially solved in the long term, new innovative efforts are being made to deal with them. Hampered by negative attitudes towards the integration of general education and technical and vocational education, lack of material resources and human expertise, faced by so many other problems clamouring for attention, the task ahead for these countries is not an easy one. Many of the problems are, however, common ones, just as common approaches to innovation may be distinguished. In the search for innovative measures which may solve or alleviate these problems, strategies must be designed so that action, even to solve a problem of fairly limited scope, will have the widest possible repercussions on other problem areas : the problems discussed here are interlinked, and so are the solutions. Such strategies should be based on identification of all factors involved in a problem and analysis of the probable consequences of any action. It is in the exercise of developing these strategies that various countries may best benefit from the exchange of mutual experience and in this area that international co-operation may prove most effective in dealing with development problems and promoting innovative trends.

7 Conclusions

The present study has drawn a broad picture of the current situation with regard to technical and vocational education in the context of overall educational development, on the basis of reports from twenty-three representative developing countries. As this study is designed for an international audience, the emphasis has been placed on areas of experience common to several or most of the countries, rather than on the particularities, with a view to sharing information useful to a number of countries and to identifying areas for more effective international co-operation.

It is clear from the material provided by the various countries that approaches to both the philosophy and structure of education have changed radically in recent years, and the expansion and development of technical and vocational education is at the very core of this change. Real progress has been made in terms of basic legislation and adoption of policy indicating intent and the future direction of educational development. A number of new structures have been created or existing ones modified to implement this policy. This action has on the whole been conceived and initiated in the spirit of the Unesco Revised Recommendation concerning Technical and Vocational Education.

In virtually all the countries, specialized technical and vocational institutions offering preparation for an occupational field at upper secondary level have been expanded, and in many cases this expansion has been, both quantitatively and in terms of the amount of resources devoted to it, the primary area of action. The major innovative thrust, however, has been in two directions : the integration of technical and vocational education with general education in comprehensive institutions and the development of post-secondary technical education. For the most part, only beginning steps have been made in these two directions as they imply wide-ranging educational reforms which can only be achieved in the long run. The expansion of the specialized institutions which come within a more traditional approach to technical and vocational education has been undertaken to meet current pressing needs for skilled workers and lower level technicians. Unfortunately, at present, these students have relatively few opportunities for higher education, and since adequate forms of continuing education for employed workers have yet to be evolved, there appear to be few opportunities for professional change or upgrading in the foreseeable future. Indeed the area where the least action has so far taken place appears to be in the development of continuing education and of comprehensive educational and vocational guidance services.

Four major problem areas are common to most of the countries. The first and most intangible is made up of attitudes of resistance to change, and negative views as to the value of technical and vocational education. The second is composed of financial restraints on development. The third is lack of co-ordination between education and employment on questions of planning, training, and curriculum development among others. The fourth area is formed by problems of implementation and improvement of technical and vocational programmes, including lack of information and research facilities for curriculum development and evaluation, hindrances to the recruitment and training of qualified teachers and lack of provision for local production of learning materials and equipment.

These problems are all closely interlinked and no one can be solved in isolation from another. Thus the most effective strategies for solving problems in one area would be developed with the possible positive repercussions in other areas in mind.[1] Such an approach is particularly important to countries, such as those compared in this study, in a position of limited resources which necessitates hard decisions as to their allocation and maximum utilization. The reports described a number of valid innovative actions directed towards developing technical and vocational education. However, the research facilities, access to information and planning and evaluation procedures necessary for closely linking these efforts within the framework of overall plans for educational reform remain unavailable to many. It is in this area of analysis and distribution of information and of promotion of research and experimentation for innovation that international co-operation may be most effective.

In conclusion, in view of the Revised Recommendation concerning Technical and Vocational Education and the situation as presented in the tewnty-three countries whose experience has been outlined in these pages, international co-operation in this field directed to better equipping countries to solve their problems might well concentrate on the following:

1. Collection, analysis and circulation of information concerning development problems in technical and vocational education and approaches to their solution,
2. Promotion of research and experimentation directed to autonomous development in the field of technical and vocational education in the following areas:
    (a) methods of co-ordinating educational planning and development with the current and projected employment situation;

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[1] For an analysis of possible approaches to developing such concurrent strategies see *Strategies for the Development of Technical and Vocational Education* (ED.76/WS/41 Unesco, 7 May 1976).

(b) methods of organizing research to identify needs and work out appropriates strategies, including development of structures, creation of facilities and initiation of experimental projects;
(c) approaches to curriculum development for technical and vocational education and technical teacher training, including co-ordination with enterprises;
(d) methods and procedures for evaluating technical and vocational education, including possible means of introducing permanent supervision and evaluation of the system as a whole;
(e) approaches to the development of locally produced equipment and learning materials, including self-learning materials especially designed for continuing education, and development at international level of model material suitable for adaptation to various local environments;
(f) methods of maximizing and rationalizing the use of equipment and facilities;
(g) approaches to continuous staff development, including organization of exchange of personnel on an international basis for study and research; and
(h) approaches to establishing national standards, corresponding to international norms where appropriate, for curricula and subsequent professional qualification, and for facilities and equipment.

Appendix I

Revised Recommendation concerning Technical and Vocational Education[1]

The General Conference of the United Nations Educational, Scientific and Cultural Organization, meeting in Paris, at its eighteenth session, held from 17 October to 23 November 1974,

Recalling the constitutional responsibilities of the Organization for the promotion of education,

Recognizing that technical and vocational education have to contribute to the maintenance of peace and friendly understanding between the various nations,

Considering that education must now be seen as a lifelong process,

Recognizing that technical and vocational education is a prerequiste for sustaining the complex structure of modern civilization and economic and social development,

Recalling the principles set forth in Articles 23 and 26 of the Universal Declaration of Human Rights guaranteeing all the right to work and to education,

Considering therefore that all have a right to an education enabling full participation in contemporary society,

Taking into account the diversity of education systems throughout the world, as well as the particular and urgent needs of developing countries,

Considering that in spite of this diversity similar goals are pursued and similar questions and problems arise in all countries concerning technical and vocational education and that therefore common standards and measures are called for,

Having adopted for this purpose at its twelfth session the Recommendation concerning Technical and Vocational Education,

Recognizing however that the rapid technological and educational changes of the last decade require new, creative, and efficient efforts in technical and vocational education to improve education as a whole for social, economic and cultural development,

Having decided at its seventeenth session that in view of these changes this Recommendation should be revised in order to better serve Member States,

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[1] Adopted by the General Conference of Unesco at its eighteenth session, Paris, 19 November 1974.

Noting that the International Labour Conference has adopted, over the years, a number of instruments dealing with various aspects of vocational guidance and vocational training and, in particular, the Vocational Guidance Recommendation, 1949, the Vocational Training (Agriculture) Recommendation, 1956, and the Vocational Training Recommendation, 1962, and that the Conference, at its 59th session, had adopted substantive conclusions with a view to adoption, in 1975, of a new instrument or instruments on vocational guidance and vocational training,

Noting further the close collaboration between Unesco and the International Labour Organisation (ILO) in drawing up their respective instruments so that they pursue harmonious objectives, avoiding duplication and conflict, and with a view to continued collaboration for effective implementation of the two instruments,

Adopts this Recommendation this nineteenth day of November 1974,

The General Conference recommends that when developing and improving technical and vocational education, Member States should apply the following provisions by taking whatever legislative or other steps may be required to give effect, within their respective territories, to the principles set forth in this Recommendation,

The General Conference recommends that Member States should bring this Recommendation to the knowledge of the authorities and bodies concerned with technical and vocational education,

The General Conference recommends that Member States should report to it, at such times and in such manner as shall be determined by it, on the action they have taken to give effect to the Recommendation.

I. Scope

1. This Recommendation applies to all forms and aspects of education which are technical and vocational in nature provided either in educational institutions or under their authority, directly by public authorities, or through other forms of organized education, public or private.
2. For the purposes of this Recommendation : 'technical and vocational education' is used as a comprehensive term referring to those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life. Technical and vocational education is further understood to be :
   (a) an integral part of general education;
   (b) a means of preparing for an occupational field;
   (c) an aspect of continuing education.
3. Technical and vocational education, being part of the total educational process, is included in the term 'education' as defined in the Convention and Recommendation against Discrimination in Education adopted by the General Conference of the United Nations Educational, Scientific and Cultural Organization at its eleventh session and the provisions of that Convention and Recommendation are therefore applicable to it.
4. This recommendation should be understood as setting forth general prin-

ciples, goals and guidelines to be applied by each individual country according to needs and resources. The application of the provisions in their particulars and the timing of the implementation will therefore depend upon the conditions existing in a given country.

II. Technical and vocational education in relation to the educational process: objectives

5. Given immense scientific and technological development, either in progress or envisaged, which characterizes the present era, technical and vocational education should be a vital aspect of the educational process and in particular should:
   (a) contribute to the achievement of society's goals of greater democratization and social, cultural and economic development, while at the same time developing the potential of individuals for active participation in the establishment and implementation of these goals;
   (b) lead to an understanding of the scientific and technological aspects of contemporary civilization in such a way that men comprehend their environment and are capable of acting upon it while taking a critical view of the social, political and environmental implications of scientific and technological change.
6. Given the necessity for new relationships between education, working life, and the community as a whole, technical and vocational education should exist as part of a system of lifelong education adapted to the needs of each particular country. This system should be directed to:
   (a) abolishing barriers between levels and areas of education, between education and employment, and between school and society through: (i) the integration of technical and vocational and general education in all educational streams above primary level; (ii) the creation of open and flexible educational structures; (iii) the taking into account of individuals' educational needs and of the evolution of occupations and jobs;
   (b) improving the quality of life by permitting the individual to expand his intellectual horizons and to acquire and to constantly improve professional skills and knowledge while allowing society to utilize the fruits of economic and technological change for the general welfare.
7. Technical and vocational education should begin with a broad basic vocational education, thus facilitating horizontal and vertical articulation within the education system and between school and employment thus contributing to the elimination of all forms of discrimination and should be designed so that it:
   (a) is an integral part of everyone's basic general education in the form of initiation to technology and to the world of work;
   (b) may be freely and positively chosen as the means by which one develops talents, interests and skills leading to an occupation in the sectors listed in paragraph 2 or to further education;
   (c) allows access to other aspects and areas of education at all levels by being grounded on a solid general education and, as a result of the integration mentioned in paragraph 6(a), containing a general education component through all stages of specialization;

(d) allows transfers from one field to another within technical and vocational education;

(e) is readily available to all and for all appropriate types of specialization, within and outside formal education systems, and in conjunction or in parallel with training in order to permit educational, career and job mobility at a minimum age at which the general basic education is considered to have been acquired, according to the education system in force in each country;

(f) is available on the above terms and on a basis of equality to women as well as men;

(g) is available to disadvantaged and handicapped persons in special forms adapted to their needs in order to integrate them more easily into society.

8. In terms of the needs and aspirations of individuals, technical and vocational education should :

(a) permit the harmonious development of personality and character and foster the spiritual and human values, the capacity for understanding, judgement, critical thinking and self-expression;

(b) prepare the individual to learn continuously by developing the necessary mental tools, practical skills and attitudes;

(c) develop capacities for decision-making and the qualities necessary for active and intelligent participation, teamwork and leadership at work and in the community as a whole.

III. Policy, planning and administration

9. Policy should be formulated and technical and vocational education administered in support of the general objectives adopted for the educational process as well as for national and, if possible, regional social and economic requirements, and an appropriate legislative and financial framework adopted. Policy should be directed to both the structural and the qualitative improvement of technical and vocational education.

10. Particular attention should be given to planning the development and expansion of technical and vocational education :

(a) high priority should be placed on technical and vocational education in national development plans as well as in plans for educational reform;

(b) planning should be based upon a thorough evaluation of both short-term and long-term needs taking into consideration any variation in needs which may exist within a country;

(c) adequate provision for proper current and future allocation of financial resources should be a major element of planning;

(d) planning should be done by a responsible body or bodies having authority on the national level. This body should have available to it data which have been collated, analysed, synthesized and interpreted by qualified staff provided with adequate research facilities.

11. Planning should be responsible to national and, if possible, regional, economic and social trends, to projected changes in demand for different classes by goods and services, and for different types of skills and knowledge in such a way that technical and vocational education may easily adapt to the evolving situation be it rural or urban. This planning should also be co-ordinated with current and projected training action and the evolution of employment.

12. While the education authorities should have primary responsibility, the following groups and authorities should be actively associated in policy formulation, and in the planning process. Structures, on both national and local levels, taking the form of public agencies or consultative or advisory bodies, should be created to permit this :
    (a) public authorities responsible for planning economic and social policy, labour and employment, and for the various occupational sectors (industry, agriculture, commerce);
    (b) representatives of non-governmental organizations within each occupation sector from among employers and workers;
    (c) any authority or body, such as a training body or extension services, responsible for out-of-school education and training;
    (d) representatives of those responsible — both in public education and in State recognized private education — for executing educational policy including teachers, examining bodies and administrators;
    (e) parent, former pupil, student and youth organizations;
    (f) representatives from the community at large.
13. Policies for the structural improvement of technical and vocational education should be established within the framework of broad policies designed to implement the principle of lifelong education through the creation of open, flexible and complementary structures for education, training and educational and vocational guidance, regardless of whether these activities take place within the system of formal education or outside it. In this respect consideration should be given to the following :
    (a) multipurpose secondary education offering diversified curricula including work-study programmes;
    (b) open tertiary institutions recruiting from a variety of sources and offering programmes ranging from short specialized ones to longer full-time programmes of integrated studies and professional specialization;
    (c) establishing a system of equivalencies whereby credit is given for completion of any approved programme and recognition is granted educational and professional qualifications achieved through various means.
14. Policy should be directed to ensuring high quality in such a way as to exclude the possibility of any judgement which discriminates between the different educational streams, whatever their ultimate goal. In this respect special efforts should be made to ensure that technical and vocational education in rural areas meets the same standards as that offered in urban ones.
15. In order to ensure quality, responsible national authorities should establish certain criteria and standards, subject to periodic review and evaluation, applying in all aspects of technical and vocational education, including to the extent possible non-formal education for :
    (a) all forms of recognition of achievement and consequent qualification;
    (b) staff qualifications;
    (c) ratios of teaching and training staff to learners;
    (d) the quality of curricula and teaching materials;
    (e) safety precautions for all learning environments;
    (f) physical facilities, building, workshop layouts, quality and type of equipment.
16. Policies should be established fostering research related to technical and

vocational education, with particular emphasis on its potential within lifelong education, and directed to its improvement. This research should be carried out by competent staff on national and institutional levels as well as through individual initiative. To this end :

(a) special emphasis should be placed on curriculum development, research concerning teaching and learning methods and materials, and where the need exists, on technologies and techniques applied to development problems;

(b) financial resources and physical facilities should be made available through institutions of higher education, specialized research institutions and professional organizations for applying the results of this research on an experimental basis in representatively selected institutions for technical and vocational education;

(c) channels should be created for the widespread dissemination and rapid application of the positive results of research and experimentation;

(d) the effectiveness of technical and vocational education should be evaluated using, among other data, relevant statistics including those concerning part-time enrolments and drop-out rates which are in some cases neglected;

(e) particular attention should be given to all research efforts to humanize working conditions.

17. Provision should be made within administrative structures for evaluation, supervisory and accreditation services, staffed by technical and vocational education specialists, to ensure the rapid application of new research findings and to maintain standards :

(a) evaluation services as a whole should ensure the quality and smooth operation of technical and vocational education by continuous review and action directed to constant improvement of staff, facilities and programmes;

(b) supervisory services for the staff should encourage improvement in the quality of teaching by providing guidance and advice and recommending continuing education;

(c) all programmes of technical and vocational education, in particular those offered by private bodies, should be subject to approval by the public authorities through some means of accreditation or form of public inspection.

18. Particular attention should be given to the material resources required for technical and vocational education. Priorities should be carefully established with due regard for immediate needs and the probable directions of future expansion and adequate cost controls introduced :

(a) institutional planning should be directed to ensuring maximum efficiency and flexibility in use;

(b) the planning, construction and equipping of facilities should be carried out in collaboration with specialist teachers and educational architects and with due regard for their purpose, prevailing local factors and relevant research;

(c) adequate funds should be allocated for recurrent expenditure for supplies and maintenance and repair of equipment.

IV. Technical and vocational aspects of general education

19. An initiation to technology and to the world of work should be an essential component of general education without which this education is incomplete. An understanding of the technological facet of modern culture in both its positive and negative attributes, and an appreciation of work requiring practical skills should thereby be acquired. This initiation should further be a major concern in educational reform and change with a view to greater democratization of education. It should be a required element in the curriculum, beginning in primary education and continuing through the early years of secondary education.
20. Opportunities for general technical and vocational initiation should continue to be available to those who wish to avail themselves of it within the educational system and outside it in places of work or community centres.
21. The technical and vocational initiation in the general education of youth should fulfil the educational requirements of all ranges of interest and ability. It should mainly perform three functions :
    (a) to enlarge educational horizons by serving as an introduction to the world of work and the world of technology and its products through the exploration of materials, tools, techniques and the process of production, distribution and management as a whole, and to broaden the learning process through practical experience;
    (b) to orient those with the interest and ability towards technical and vocational education as preparation for an occupational field or towards training outside the formal education system;
    (c) to promote in those who will leave formal education at whatever level but with no specific occupational aims or skills, attitudes of mind and ways of thought likely to enhance their aptitudes and potential, to facilitate the choice of an occupation and access to a first job, and to permit them to continue their vocational training and personal education.
22. Required general technical and vocational studies in the schools having great importance for the orientation and education of youth, should include a proper balance between theoretical and practical work. A properly structured programme of such studies should be drawn up by the competent authorities in collaboration with the professional community and with those responsible for technical and vocational education. These programmes should :
    (a) be based upon a problem-solving and experimental approach and involve experience in planning methods and decision-making;
    (b) introduce the learner to a broad spectrum of technological fields and at the same time to productive work situations;
    (c) develop a certain command of valuable practical skills such as tool use, repair and maintenance and safety procedures, whether applicable to future education, training and employment or to leisure time, and a respect for their value;
    (d) develop an appreciation of good design and craftsmanship and the ability to select goods on the basis of their quality;
    (e) develop the ability to communicate including the use of graphical means;
    (f) develop the ability to measure and calculate accurately;

(g) be closely related to the local environment without, however, being limited to it.

23. The technical and vocational initiation in programmes of general educational enrichment for older youth and adults should be directed to enabling those engaged in working life to :
    (a) understand the general implications of technical change, its impact on their professional and private lives, and how man may shape this change;
    (b) to use practical skills for improving the home and community environment and thus the quality of life and, in appropriate conditions, for productive leisure-time activites.

V. Technical and vocational education as preparation for an occupational field

24. Given disparities that may exist between formal education, whether secondary or tertiary, and the employment and career opportunities available, the highest priority should be given to technical and vocational education which prepares young people to exercise occupations in the sectors covered by this recommendation. Consequently the structure and content of traditional education, whether general or technical and vocational, should be adapted accordingly through :
    (a) the diversification of secondary education in the later stages so that it may be pursued in conjunction with employment or training, or may lead to employment or to higher education, thereby offering to all youth educational options corresponding to their needs;
    (b) the introduction of new programmes into tertiary education more relevant to the career needs of young adults;
    (c) the development of educational structures and programmes on all levels centred on organized and flexible interchange between educational institutions including training institutions and those responsible for employment in the various occupational sectors.
25. Technical and vocational education as preparation for an occupational field should provide the foundation for productive and satisfying careers and should :
    (a) lead to the acquisition of broad knolwedge and basic skills applicable to a number of occupations within a given field so that the individual is not limited by his education in his freedom of occupational choice, and later transfer from one field to another in the course of working life is facilitated;
    (b) at the same time offer a thorough and specialized preparation for initial employment and effective training within employment;
    (c) provide the background in terms of skills, knowledge and attitudes, for continuing education at any point in the individual's working life.
26. Premature and narrow specialization should be avoided :
    (a) in principle 15 should be considered the lower age limit for beginning specialization;
    (b) a period of common studies concerning basic knowledge and skills should be required for each broad occupational sector before a special branch is chosen.

27. Because it is desirable that women seek wider participation in all kinds of occupations outside family and domestic activities, they should have the same educational opportunities available to them as men in order to prepare for an occupation and should be encouraged to take advantage of these through appropriate legislative measures and widespread distribution of information concerning these opportunities.
28. Special provision should be made for out-of-school and unemployed youth and children of migrant workers with the minimum or less of primary education, as well as for those not entering education or training programmes after completion of compulsory schooling, in order that they may acquire employable skills.
29. Given the necessity of integrating the physically and mentally disadvantaged into society and its occupations, the same educational opportunities should be available to them as to the non-handicapped in order that they may achieve qualification for an occupation; special measures or special institutions may be required.

Organization

30. Technical and vocational education as preparation for an occupational field should be organized on a national or, if possible, regional basis, so as to respond positively to over-all social, economic and educational requirements and to the needs of different groups of the population without discrimination.
31. Several organizational patterns of technical and vocational education, including both full-time and part-time options should exist within each country. The following patterns of organization for example should be considered :
    (a) full-time including practical training as well as general education, provided in an educational establishment, either comprehensive or specialized;
    (b) part-time programmes such as the following in which general education and theoretical and broad practical aspects of the occupational field are given in an educational establishment while specialized practical training is acquired during work in the chosen occupation : (i) the day-release system providing for young workers and apprentices to attend an educational establishment at least one day a week and preferably two; (ii) the sandwich system under which periods in an educational institution alternate with training periods in a factory, farm, business establishment or other undertaking; (iii) the block-release system whereby young workers are released to attend courses for one or two short periods of at least ten to fifteen weeks in total length per year which may be especially adapted to conditions in areas of low population density by provision of boarding facilities.
32. The responsible authorities should encourage part-time education, therefore :
    (a) these programmes should be available directly after completion of minimum compulsory or required schooling, and should continue to be available to the highest level of formal education;
    (b) the educational qualifications acquired by this means should be equivalent to those acquired by full-time education;
    (c) where employers are responsible for the practical training aspect for part-time students, this training should be as broad as possible serving the educational and training needs of the individual, and should meet national standards.

33. In view of the increasing requirement for highly qualified middle-level manpower in all fields, and the increasing numbers completing secondary education or its equivalent, the development of programmes of technical and vocational education corresponding to further qualifying tertiary education should be given high priority. The following patterns of organization should be considered :
    (a) a period of from one to two years of guided work experience followed by a part-time or briefer full-time programmes of specialization;
    (b) part-time programmes;
    (c) full-time programmes as an extension of programmes given in specialized secondary institutions or given in tertiary institutions.
34. The high cost of equipment for the practical component of technical and vocational education requires that this be organized so that benefits received are in proportion to the cost. Consideration should be given to the following as a means of achieving this :
    (a) centralized workshops, or mobile units, could be used to serve several educational institutions;
    (b) workshops attached to educational institutions could be designed so that they are suitable for use by the community at large particularly for continuing education programmes;
    (c) although workshops and laboratories in advanced secondary or tertiary institutions should be designed primarily for pedagogical purposes, they might also be equipped and staffed so that equipment for use in technical and vocational studies in general education may be produced.
35. Enterprises should be closely associated in the practical training of those preparing for occupations in their particular sector, and should be encouraged to take responsibility, in co-operation with educational institutions, for the organization of this training.

Programme content

36. All programmes of technical and vocational education as preparation for an occupational field should :
    (a) aim at providing scientific knowledge, technical versatility and the broad skills and knowledge required for rapid adaptation to new ideas and procedures and for steady career development;
    (b) be based on an analysis of broad occupational requirements worked out for the long term between education authorities including organizations representing educational research and administration and employment authorities and occupational organizations concerned;
    (c) include a proper balance between general subjects, science and technology, and studies of both the theoretical and practical aspects of the occupational field, with the practical component in all cases related to the theoretical one;
    (d) stress developing a sense of professional values and responsibilities from the standpoint of human needs.
37. In particular programmes should :
    (a) whenever possible be interdisciplinary in character as many occupations now require knowledge and training in two or more traditional areas of study;

(b) be based on curricula designed around core knowledge and skills;
(c) include studies of the social and economic aspects of the occupational field as a whole;
(d) include the study of at least one foreign language of international use which, while conducive to a higher cultural level, will give special emphasis to the requirements of communication and the acquisition of a scientific and technical vocabulary;
(e) include an introduction to organizational and planning skills;
(f) emphasize instruction in safety procedures relative to the materials and equipment used in a given occupational field and the importance of safe working conditions and the health aspects relative to the occupation as a whole.

38. While based on the above general principles and components, and thus pursuing in all cases broader educational aims, programmes in their practical aspect should be designed taking into account special occupational requirements with regard to the particular executive, organizational, analytical and practical skills required.

39. Technical and vocational education programmes leading to university qualification, while encouraging research and offering high-level specialization, should be developed with particular attention to:
(a) the inclusion of components directed to developing attitudes whereby those with broad responsibilities in technological fields constantly relate their professional tasks to larger human goals;
(b) relating more closely higher technical and vocational education for the industrial and agricultural sectors to the requirements of these sectors. In this regard consideration should be given to creating within tertiary institutions, centres for the testing and certification of industrial and agricultural products, supervised by the public authorities and serving both educational and research purposes.

40. Programmes of technical and vocational education as preparation for occupations within the agricultural sector should be designed in accordance with the over-all social and economic requirements of rural development. Therefore:
(a) both general aspects and the technical and vocational aspects, while adapted in terms of both organization and content to the special requirements of agricultural occupations, should be of the same quality as those for other occupational areas;
(b) programmes should be directed to the development and application of technologies especially suited to rural development through close co-ordination between education and extension services and between these and research services and institutions;
(c) programmes should be directed to preparing qualified people for all types of occupations and ranges of technical competence necessary for rural development;
(d) programmes should be broadly conceived, including in addition to the special occupational area, an introduction to the commercial aspects of agriculture and the functioning of rural economic institutions.

41. Where lack of resources limits the expansion of technical and vocational education, emphasis in the initial stages should be placed on developing programmes for occupations in areas of critical manpower shortage, and in areas of immediate development potential.

42. Programmes preparing for occupations in small industry, individual farming or the artisan trades, whether urban or rural, and particularly for self-employment, should include commercial studies enabling those engaged in such occupations to take responsibility not only for production, but also for marketing, competent management and the rational organization of the whole enterprise.
43. Programmes leading to occupations in the business and commercial sector should include :
    (a) a thorough grounding in the methods and skills developed as a result of the application of technology to business and office management and particularly to the acquisition and processing of information;
    (b) training in the organizational and management skills required for the smooth operation of enterprises in all economic sectors;
    (c) an introduction to marketing and distribution procedures.
44. Special attention should be given to developing programmes for preparing personnel at all levels for the social services sector (e.g. community and family work, nursing and paramedical occupations, nutrition and food technology, home economics and environmental improvement). Those programmes should :
    (a) emphasize the relation of the special occupational field to raising standards of living in terms of food, clothing, housing, medical services, the quality of family life or that of the environment as the case may be;
    (b) be well adapted to the special requirements of local conditions in particular those of climate and geography, materials available and community organization and social patterns.

VI. Technical and vocational education as continuing education

45. The development and expansion of technical and vocational education as continuing education, both within and outside the formal education system, and within the framework of lifelong education, should be a priority objective of all educational strategies and broad provision should be made for allowing everyone, whatever the educational qualifications achieved prior to employment, to continue both their professional and general education.
46. In addition to permitting adults to make up deficiencies in general education or professional qualifications, which has often been the only objective of continuing education, it should now :
    (a) offer possibilities of personal development and professional advancement;
    (b) permit the updating and refreshing of knowledge and practical abilities and skills in the occupational field;
    (c) enable the individual to adapt to technological changes in his occupation or to enter another occupation if these changes render his particular job obsolete;
    (d) be available throughout working life without restriction of age, sex, prior education and training or position;
    (e) be broad in scope, including general education elements, and not simply specialized training for one particular job.
47. The appropriate authorities should be encouraged to provide the basic conditions for technical and vocational education as continuing education,

including consideration of measures providing for paid educational leave or other forms of financial aid.

48. The technical and vocational aspect of continuing education should actively be encouraged through such means as :
    (a) widespread dissemination of information concerning the programmes available, and how one may take advantage of existing opportunities, including full use of mass media to this end;
    (b) recognition of successful completion of programmes in terms of remuneration and professional advancement.

49. Those responsible for organizing programmes of continuing technical and vocational education recognized by the public authorities should consider the following forms :
    (a) courses given during working hours at the place of work;
    (b) fuller part-time courses especially designed for continuing education given in secondary and tertiary institutions, already staffed and equipped for technical and vocational education;
    (c) evening and week-end courses given in the above types of institutions or in community centres;
    (d) correspondence courses;
    (e) courses given on educational television;
    (f) periodic seminars;
    (g) inter-enterprise programmes;
    (h) informal discussion groups created and organized on the initiative of students.

50. The following forms of organization of leave should be considered :
    (a) day release;
    (b) block release of varying lengths;
    (c) release for one or more hours during the working day.

51. Programmes of technical and vocational education as continuing education should :
    (a) be designed and taught on the basis of the special requirements of adults, and use teaching methods which take into account the expertise which they have already acquired;
    (b) contain a built-in mechanism for rapid adjustment to the needs of particular individuals or groups and to technological change.

52. Special provision should be made for groups with particular requirements :
    (a) in the case of women, because of the necessity of periods of absence from the labour force imposed by maternity and family responsibilities, in order to enable them to update their knowledge and to improve their professional skills for re-entry into employment;
    (b) to enable older workers to adapt to new occupations;
    (c) to provide foreign workers and handicapped workers with specific facilities for pre-training to enable them to adapt to a training programme or to working life;
    (d) the resources of continuing education should be used to offer unskilled and semi-skilled workers the opportunity to improve their qualifications.

53. Particular attention should be paid to the development of continuing education programmes suitable in rural areas in terms of content, physical location and time of year offered.

VII. Guidance

54. Guidance should be viewed as a continuous process and a vital element in education, directed to aiding all to make positive educational and occupational choices. It should ensure that the individual be provided with the necessary prerequisites :
    (a) to become aware of his interests and abilities and able to set himself precise objectives;
    (b) to pursue a course of education, whether preparatory or continuing, commensurate with these;
    (c) to make decisions concerning his occupation, both in the initial and later stages, which lead to a satisfying career;
    (d) to facilitate transitions between education and employment at whatever level or stage.

55. Guidance services on the national, local and institutional levels should ensure that the paths are kept open between education and initial training and employment, and employment and continuing education and training through :
    (a) close liaison and co-ordination with training, counselling, employment and placement services;
    (b) ensuring that all necessary information concerning employment and career opportunities is available and actively disseminated;
    (c) ensuring that those in employment have access to information concerning opportunities in continuing education and training.

56. While emphasizing the needs of the individual, guidance for young people should be accompanied by information which gives them a realistic view of the opportunities available in a given occupational cluster, including information regarding probable developments in the market and in employment structures, and what may be expected in terms of remuneration, career advancement and possibilities for occupational change.

57. Particular attention should be given to guidance for girls and women :
    (a) this guidance should cover the same broad range of education, training and employment opportunities as for boys and men;
    (b) it should systematically encourage girls and women to take advantage of the opportunities available to them.

58. Guidance given in the technical and vocational aspects of general education during the observation or orientation cycle of secondary schooling should :
    (a) cover a broad range of occupations with supplementary visits to work places and acquaint the student with the eventual necessity of choosing an occupation and the importance of this choice being as rational as possible;
    (b) aid students in making a positive choice concerning educational streams or options for those wishing to pursue technical and vocational education as preparation for an occupational field or training programmes outside the educational system, and aid those not continuing their formal education or entering training to find employment, while encouraging them to continue their education at a later date.

59. Guidance in technical and vocational education as preparation for an occupational field should :
    (a) inform the student of the various possibilities open in the particular field

of interest, the educational background required and the possibilities for later continuing education available;

(b) encourage the student to choose an educational programme which will limit his later employment options as little as possible;

(c) follow the progress of the student during the educational programmes;

(d) supplement the later stages of the programmes by short periods of work experience and study of real work situations.

60. Guidance in technical and vocational education as continuing education should:

(a) help the employed adult choose the programme of continuing education most suited to his needs;

(b) enable him to place himself in relation to the various levels of study and afford him the means of making effective choices.

61. Guidance should be given on the basis of:

(a) knowledge of the individual which takes account of the social and family factors influencing his attitudes and expectations;

(b) information obtained from objective evaluation of the results of testing including aptitude tests;

(c) knowledge of his educational achievements and/or achievements in employment;

(d) knowledge of employment and career opportunities as well as job satisfaction in the occupational sector in which he is interested or engaged and of demands made;

(e) medical records indicating whether the student is physically able to pursue a given occupation.

62. The effectiveness of guidance services should continually be assessed and statistics kept on both the national and institutional levels through:

(a) the keeping of cumulative records concerning the education of the students as well as follow-up records concerning his employment;

(b) a built-in system of evaluation of both quality of staff performance and the methods used in order to effect change or improvement where needed.

VIII. The teaching and learning processes: methods and materials

63. In all aspects of technical and vocational education, the methodology of learning should assume equal importance in the teaching and learning process with the subject-matter itself. All aspects of technical and vocational education should be oriented to the needs of the learner and directed to motivating him, and methods and materials developed accordingly.

64. Theory and practice should form an integrated whole: what is learned in the laboratory, workshop or in enterprises should be directly related to the mathematical and scientific foundations of the particular operation or process, and conversely, technical theory, as well as the mathematics and science sustaining it, should be illustrated through their practical applications.

65. Full use should be made of the resources provided by educational technology, with special emphasis on the methods and materials of self-education, in particular audio-visual aids, including multi-media systems, programmed instruction and the use of mass media.

66. The methods and materials used in technical and vocational education

should be carefully adapted to the group to be taught. In this respect :

(a) where the language of instruction differs from the native language, teaching materials should make maximum use of numerical and graphical representation, written material being kept to a minimum;

(b) where materials developed in one country are adapted for use in another, this adaptation should be carefully made with due regard to local factors.

67. Machines and equipment used in workshops in educational institutions should be geared to the level and training of the users. This equipment should be simple and designed especially for pedagogical purposes without however being obsolete or teaching obsolete procedures. Training using complex equipment may be given more appropriately and efficiently on the job.

Evaluation

68. Evaluation should be an integral part of the teaching and learning process in technical and vocational education, and its major function should be the development of the particular individual in accordance with his interests and capacities.

69. Although standards of performance should be upheld, evaluation of the student's work should be made on a total basis considering among others his class participation, his interest and attitude, his relative progress, allowance being made for his aptitudes, and examinations and other tests.

70. Students should participate in the evaluation of their own progress and the evaluation of student work should have a system of feedback built into it so that learning problems and their causes may be identified and steps taken to correct them.

71. Continuous evaluation of the teaching process should be made by both teachers and their supervisors, with the participation of students as well, in order to determine the effectiveness of the methods and materials used, and to devise alternatives should the need arise. Continuous evaluation of the teaching-learning process should be undertaken with the participation of representatives from the occupational fields concerned.

IX. Staff

72. To enhance the achievement of the objectives of technical and vocational education, a priority should be given to the recruitment and preparation of adequate numbers of well-qualified and competent teachers, administrators, and guidance staff and to the provision of the necessary training and other facilities to enable them to function effectively in their profession.

73. The emoluments and conditions of service which are offered should compare favourably with those enjoyed by persons with similar qualification and experience in other occupational sectors. In particular, promotions, salaries and pension scales for technical and vocational education staff should take into account any relevant experience acquired in employment outside the educational sector.

Teaching staff

74. All teachers in technical and vocational education, including those who teach only practice, should be considered an integral part of the teaching profession and as such should be recognized as having the same status as their colleagues in other fields. In this regard:
    (a) the Recommendation concerning the Status of Teachers adopted by the Special Intergovernmental Conference on the Status of Teachers on 5 October 1966 is applicable to them especially as regards the provisions concerning preparation for a profession and continuing education; employment and career; the rights and responsibilities of teachers; conditions for effective teaching and learning; teachers' salaries; social security;
    (b) arbitrary distinctions between teachers employed by various types of educational institutions, e.g. specialized technical and vocational institutions and general education institutions, should be eliminated.
75. Teachers involved in any aspect of technical and vocational education, whether on a full-time or part-time basis, should posses the personal, ethical, professional and teaching qualities essential for the accomplishment of their work.
76. Teachers of technical and vocational aspects in general education should:
    (a) be familiar with a broad range of specialities;
    (b) develop the ability to relate these to each other as well as to the larger social, economic and historical and cultural context;
    (c) where this aspect of technical and vocational education serves primarily an occupation or educational orientation function, be able to give guidance.
77. Considering technical and vocational education as preparation for an occupational field, teachers in this area should have special qualifications depending on the occupation for which they are preparing students:
    (a) if the occupational field requires primarily practical skills the teacher should himself have long employment experience in the exercise of these skills;
    (b) if students are to be prepared for technician or middle management positions, teachers should have a thorough knowledge, preferably acquired through appropriate practical experience, of the special requirements of this type of position;
    (c) if the occupational field requires research and theoretical analysis, e.g. an engineering field, the teacher should have a university education and be actively engaged in research himself.
78. Considering technical and vocational education as continuing education, teachers in this area should, in addition to the special preparation for teaching adults, have an adequate knowledge of the working environment of their students and have specialized knowledge and skills in their teaching field.
79. Skilled professionals employed in appropriate sectors outside education should be invited to teach, at suitable points in technical and vocational education, certain programmes in schools, universities or other educational institutions in order to link the world of work more closely to the classroom.
80. Teachers of general subjects in institutions which offer technical and vocational education, in addition to the usual qualification, both professional

and in their teaching field, should receive a special initiation concerning the objectives and requirements of technical and vocational education.

81. Preparation for technical and vocational teaching should be given as a tertiary programme, thereby requiring completion of secondary education or its equivalent for entrance. All types of programme should be designed with the following objectives in mind :
    (a) to maintain standards of education and professional preparation in vigour for the teaching profession as a whole and to contribute to the raising of these over-all standards;
    (b) to develop in the future teacher the ability to teach both theoretical and the practical aspects of his field;
    (c) to ensure that the teacher will be qualified, with minimum further training, to teach other groups than those for which he was prepared initially.

82. Varied and flexible programmes, full time and part time, adapted to the special requirements of a wide variety of recruitment sources as well as to those of the field to be taught and the group or groups to be taught should be available.

83. In those cases where it is difficult for intending technical and vocational teachers to acquire employment experience, consideration should be given to creating units, attached to teacher-training institutions, for the production of equipment and teaching materials for the schools in which intending teaching staff would be required to work for varying lengths of time.

84. The professional preparation of all technical and vocational teachers should include the following elements :
    (a) educational theory both in general and as especially applying to technical and vocational education;
    (b) educational psychology and sociology as it especially applies to the group or groups for which the future teacher will be responsible;
    (c) special teaching methods appropriate to the field of technical and vocational education for which the future teacher is preparing and the groups to be taught, in methods of evaluation of student work, and in classroom management;
    (d) training in the choice and use of the whole range of modern teaching techniques and aids presupposing the use of up-to-date methods and materials in the programme of professional preparation itself;
    (e) training in how to create and produce appropriate teaching materials, of special importance in those cases where technical and vocational materials are in short supply;
    (f) a période of supervised practice teaching experience before appointment to a teaching post;
    (g) an introduction to educational and occupational guidance methods as well as to educational administration;
    (h) a thorough grounding in safety and emphasis on the ability to teach safe working practice and habitually to set a good working example.

85. Staff responsible for the preparation of technical and vocational teachers should have obtained the highest qualifications possible in their field :
    (a) teacher-educators responsible for special technical and vocational fields should have qualifications in their field equivalent to those of special subjects staff in other institutions and programmes of higher education,

including advanced degrees and employment experience in a related occupational fields;

(b) teacher-educators responsible for the pedagogical aspect of teacher preparation should themselves be experienced teachers in technical and vocational educationl and should possess the highest qualifications in a specialized field of education.

86. Staff responsible for the preparation of technical and vocational teachers should be actively engaged in research in their field and provision should be made for this in terms of a reasonable teaching load and access to appropriate facilities.

87. Teaching staff should be encouraged to continue their education, whatever the field in which they specialize, and should have the necessary means to do so. This continuing education which should be made available in a wide range of facilities, should include :
    (a) periodic review and updating of knowledge and skills in the special field;
    (b) periodic updating of professional skills and knowledge;
    (c) periodic work in the occupational sector relating to the special field.

88. Account should be taken of a teacher's achievements in continuing education when the responsible authorities consider questions of promotion, seniority and status concerning him.

Administrative and guidance staff

89. Administrative responsibilities for technical and vocational education programmes should be entrusted to persons with the following qualifications :
    (a) teaching experience in a field of technical and vocational education;
    (b) proficiency acquired through study and employment experience in one of the fields taught in the programme;
    (c) a broad vision of technical and vocational education as a whole and of the interrelation of the various aspects;
    (d) a knowledge of administrative techniques.

90. The heads of establishments in technical and vocational education should receive adequate administrative assistance so that they can devote most of their time to the highly important educational and scientific aspects of their work. Technical and vocational education establishments should have sufficient staff to provide the following services :
    (a) advice and guidance for candidates and students;
    (b) the preparation, supervision and co-ordination of all practical work and experiments;
    (c) the maintenance of instruments, apparatus and tools in workshops and laboratories;

91. Administrators should keep up to date with new administrative techniques and trends through programmes of continuing education. Prospective administrators should receive special training in methods and problems involved in the task. This preparation should include :
    (a) management methods appropriate to educational administration;
    (b) methods of allocation of available resources given the objectives of the various programmes for which they will be responsible;
    (c) planning methods.

92. Guidance staff should receive special preparation for their tasks whether

they are specialists or are teachers serving also as guidance staff. This preparation should be equipped to make objective assessments of aptitude, interest and motivation and to have at hand up-to-date information concerning career and education opportunities. During this preparation they should acquire a direct knowledge of the economy and the world of work through systematically organized visits to enterprises and periods of time spent in enterprises. Guidance staff should be required and provided with facilities — including the opportunity for practical experience — to keep up with new methods of guidance and information as to new or changed educational training and employment opportunities.

X. International co-operation

93. Member States should give priority to international co-operation in the field of technical and vocational education.
    (a) This co-operation, whether in the framework of bilateral or multilateral agreements, or through international organizations, should be directed to improving the quality of technical and vocational education and developing and expanding it where necessary.
    (b) Every effort should be made to co-ordinate within any given country the international assistance activities in the field of technical and vocational education.

94. Member States should take special measures to provide foreigners (in particular migrants and refugees) and their children living within their territory with technical and vocational education. Such measures should take into account the special needs of such persons in the host country as well as in view of their possible return to their country.

95. Provision should be made at national, regional and international levels for the regular exchange of information, documentation, and materials of international interest obtained from research and development efforts on all levels concerning technical and vocational education, in particular:
    (a) publications concerning, among others, comparative education, psychological and pedagogical problems affecting general and technical and vocational education, and current trends;
    (b) information and documentation concerning curriculum development, methods and materials, study opportunities abroad, employment opportunities including manpower requirements, working conditions and social benefits;
    (c) teaching materials and social benefits;
    (d) mass media programmes of an informational or pedagogical character.

96. Regional co-operation among countries having a common cultural heritage and facing common problems in the development or extension of technical and vocational education should be highly encouraged through:
    (a) periodic meetings on the ministerial level and the establishment of a standing committee or organization to review policies formulated and actions taken;
    (b) the creation of joint facilities for higher level research, the development of prototype materials and equipment, and the preparation of staff for the training of teachers where the costs of such facilities are too high to be sustained by any one country in a given region.

97. The development of both written and audio-visual teaching and learning materials which are suitable for international or regional use should be considered a priority area in international co-operation. These materials should contribute to the progressive establishment of common standards for professional qualifications acquired through technical and vocational education.

98. Member States should encourage the creation of a climate of opinion favourable to international co-operation in the field of technical and vocational education through :
    (a) teacher and student fellowships and exchanges;
    (b) establishment of sustained contacts between similar institutions in different countries;
    (c) provision of employment experience abroad, particularly when opportunities at home are limited.

99. To facilitate international co-operation, Member States should apply within technical and vocational education internationally recommended standards and norms relating in particular to :
    (a) system of measure;
    (b) scientific and technical symbols;
    (c) occupational qualifications;
    (d) information processing;
    (e) equivalencies of qualifications acquired through technical and vocational education implying standardization of curricula and testing, including aptitude tests, for some technical fields;
    (f) safety and security through testing of materials and products.

100. Internationally recommended standards and norms concerning technical and vocational education should be continuously evaluated through sustained research concerning the effectiveness of their application in the various countries especially in order to facilitate the establishment of equivalence of qualifications and free movement of individuals between the different national systems of education.

Appendix II

Guidelines for preparing country reports

The following guidelines, along with the Unesco Revised Recommendation concerning Technical and Vocational Education, should be used in drawing up the country reports. These guidelines are designed so that the resulting reports will not only provide information on individual countries but may also be analysed as a whole within the international framework provided by the Recommendation. The formulation and presentation of the reports within this common framework will facilitate exchange of information and experience and enable areas of fruitful co-operation to be more easily delineated as well as suggest more effective means of implementing the Recommendation.

These guidelines consist of two parts. The first calls for a profile of technical and vocational education in your country. The second part deals with the dynamics of the national process for developing technical and vocational education and introducing innovations and calls for a discussion of the following:

1. An analysis of the major problems hindering the development of technical and vocational education.
2. The areas in which innovation and experiment are currently under way.
3. The means by which reforms are and will be incorporated into general policy and this policy implemented.

The guidelines have been formulated with a view to the eventual adoption of a model for organizing information from individual countries concerning the development of technical and vocational education. Such information presented within a commonly understood framework and made readily available through some form of international network would considerably facilitate the task of research and development in the field of technical and vocational education on both national and international levels.

Unesco, Paris, March 1976

Part I. Technical and vocational education profile

1. *Structures* (see Unesco Revised Recommendation concerning Technical and Vocational Education, paras. 1–2, 9–17)

Briefly describe and illustrate graphically :

1.1 The structure of the education system as a whole and the place of technical and vocational education including teacher training within it, indicating the articulation between stages of schooling and between school and work, and where possible, the relationship between in-school and out-of-school programmes.

1.2 The organizational structures, showing relationships and linkage among them, for :

  1.2.1 overall policy-making and planning for technical and vocational education;

  1.2.2 research and development; and the collection and dissemination of information (if possible annex to your report the names of such institutions);

  1.2.3 co-ordinating in-school and out-of-school programmes and co-ordinating technical and vocational education with manpower planning and employment;

  1.2.4 the administration, including supervisory services.

2. *Financing* (see Revised Recommendation, paras. 10(c) and 18)

Describe how technical and vocational education is financed, including :

2.1 Figures showing the percentage of the total education budget allocated to it.

2.2 Indications of the sources of this financing including external aid.

2.3 Unit costs per student per year.

3. *Technical and vocational aspects of general education* (see Revised Recommendation, paras. 19–23)

In your description please consider the following :

3.1 Major objectives.

3.2 Characteristics of the target group : age groups and grade levels which have access to courses of general technical and vocational studies as part of the general education programme, including if possible statistics showing (a) the percentage of the total school population in these groups and grades now having access to such studies, and (b) the ratio of males to females in the courses.

3.3 General characteristics of programmes, indicating for example the relative emphasis on theory and practice, on educational or occupational guidance; the differences, if any, between programmes offered in urban and rural areas or to males and females.

4. *Technical and vocational education as preparation for an occupational field* (see Revised Recommendation, paras. 24–44)

Please consider the following:

4.1 Major objectives.

4.2 Characteristics of the target group, providing a statistical picture of such items as:

  4.2.1 the percentage of the total 15–22-year-old group enrolled in technical and vocational education;

  4.2.2. enrolment in technical and vocational education programmes as a percentage of the total enrolment of this age group in educational institutions;

  4.2.3 the proportion of males to females enrolled in technical and vocational education programmes;

  4.2.4 the proportion of those enrolled in full-time programmes to those in part-time programmes;

  4.2.5 enrolment in each of the following branches as a percentage of total enrolment in technical and vocational education: industrial, agricultural, commercial, services, other (please specify);

  4.2.6 the percentage of unemployed in this age group among those having completed secondary education and not admitted to higher education;

  4.2.7 the percentage of unemployed among those having completed secondary or post-secondary technical and vocational education programmes.

4.3 Organization:

  4.3.1 types of institutions on both secondary and tertiary levels offering full-time programmes;

  4.3.2 types of part-time programmes;

  4.3.3 modes of participation of or collaboration with the various employment sectors, public and private, and public agencies responsible for training programmes outside the education system.

4.4 General characteristics of programmes including the occupational areas now emphasized and the extent to which programmes lead to job qualification according to nation-wide standards and how these standards are maintained.

5. *Technical and vocational education as continuing education* (see Revised Recommendation, paras. 45–53)

Please describe:

5.1 The facilities available for continuing education in educational institutions, at places of work or through other means of organization.

5.2 Characteristics of the target group (age, professional levels, occupational fields, etc.).

5.3. The types of programme offered and means of recognition of achievement.

5.4 Measures taken to encourage continuing education while in employment in terms of job promotion, publicity, time off, etc.

6. *Guidance* (see Revised Recommendation, paras. 54–62)

Outline the general characteristics of the guidance services available within technical and vocational education including especially information with regard to evaluation and follow-up procedures of these services.

7. *The teaching and learning processes: methods and materials* (see Revised Recommendation, paras. 63–71)

Indicate the general pedagogical principles underlying teaching and learning in technical and vocational education illustrated by particular reference to significant characteristics of materials and equipment used, emphasis on practical work, evaluation of the teaching and learning process.

8. *Staff* (see Revised Recommendation, paras. 72–92)

Give a succinct picture of the recruitment, training and qualifications required of teachers in the programmes covered in items 3, 4 and 5 above.

9. *International co-operation* (see Revised Recommendation, paras. 93–100)

Indicate the ways in which your country now participates in international co-operation for the development of technical and vocational education.

Part II. Dynamics of the development process

1. *Major problems*

Analyse the major problems faced by your country in developing technical and vocational education, for example:

1.1 On the 'macro' level of overall national policy:
  1.1.1 inequalities between technical and vocational education and general education and between rural and urban education which impede the democratization of education as a whole;
  1.1.2 obstacles to overall reform of education which in consequence hinder the development of technical and vocational education, such as the selection and examination process, restriction of education to traditional institutions, over-emphasis on traditional academic areas in education, etc.;
  1.1.3 maladjustment between education and employment as reflected in a lack of correspondence between economic development needs and the training and education provided within the education system, and in a high rate of youth unemployment.
1.2 On the 'micro' level within technical and vocational education:
  1.2.1 lack of provision for general technical and vocational studies within the general education curriculum;
  1.2.2 inadequacy of upper and post-secondary programmes for the preparation of technicians;
  1.2.3 ineffective teaching and learning methods and materials;
  1.2.4 difficulties in recruiting and training qualified teachers;
  1.2.5 lack of documentation and information services for technical and vocational education.

2. *The process of innovation and experiment*

In what problem areas identified in your reply to item 1 above is your country undertaking (or has undertaken) experiment and innovation to develop solutions? Briefly describe the experiments, including:

2.1 The process for deciding on priority areas and for initiating experiment and innovation.
2.2 The role of research in identifying the specific problems to be dealt with and in formulating projects undertaken on an experimental basis.
2.3 The obstacles encountered in the course of the experiments and how these were overcome.
2.4 How results were evaluated.

3. *Policy and implementation*

Describe the process in your country for incorporating the successful results of experimentation into general policy, and indicate how this policy is, or will be, implemented.

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Appendix III

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This comparative study sets out the current situation and possible future trends of technical and vocational education in twenty-three countries.

It is based on reports submitted by those countries to an international conference held in Denver, Colorado, United States, in 1976. In addition to providing an outline of the present status of technical and vocational education in those countries, the study stresses ongoing reforms and innovations in that field.

It is aimed particularly at teacher-educators, educational administrators and educational planners.

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